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EXTERNAL INJURIES TO THE EYE.*

BY DR. THOS. MCDAVITT, SURGEON OCULIST, ST. PAUL, MINN.

After injuries to the hands and arms, probably the most common in railroad men are those to the eyes. The prompt and proper treatment at first is of great importance, as it frequently saves an eye, and also the railroad company from defending a suit. This subject has been so frequently presented that very little, if anything, new can be said on the subject; but its importance demands that it be often placed before railroad surgeons.

Foreign bodies frequently blow into eyes and merely fall into the conjunctival sac, and cause little or no disturbance, being washed out by the tears. Again the body may be there, and it is almost impossible to find it. Frequently a search will be made, the eyeball examined carefully, with no result; but the severe irritation indicates a foreign body, and a turning of the upper lid, and searching the retro-tarsal fold, may reveal an object, the size of which is astonishing, and its removal is immediately followed by a subsidence of all symptoms. The main fear of foreign bodies in the eye outside of the globe is ulceration of cornea. This is as liable to occur from the foreign body being in the conjunctiva as anywhere else, and it is therefore important to remove it quickly, and also to keep the sac as aseptic as is possible. Evidently the least manipulation necessary for the removal of foreign bodies, the better it is for the tissues. A stream of antiseptic water, or a small cotton swab, is preferable to the use of harsher means.

After the body is removed, it may be necessary to use iced cloths, or hot cloths, whichever gives most relief, and the frequent douching of the conjunctival sac with warm boric acid solution I have often found of great relief. When a foreign body has penetrated into the cornea, it should be removed without loss of time. A very common accident is to have a small, hot cinder penetrate the outer layers of the cornea, actually burning a bed into it. If that cinder can be removed promptly, there is usually little trouble; but if allowed to remain a few hours, the part becomes infected and often there are serious results. Frequently the body can be removed by a small portion of cotton attached to a probe, but I have sometimes found that a very small shred might be left attached to some of the irregularities of the edge of bed, and in that way act as an irritant until removed. The better way is to remove it, if at all firmly attached, with an aseptic instrument. Clean out thoroughly, and if there be any fears of infection, lightly cauterize the bottom and edge of bed with the dull red cautery. Often after this treatment a very unpromising looking eye will begin immediately to improve, and if there is a slight cicatrix, it is frequently promptly reabsorbed. It is astonishing how quickly a cicatrix, seeming very thick, is absorbed, if followed up by a cauterization.

A class of eye injuries which gives a great deal of trouble comes frequently from machine shops, where a piece of steel or emery, or other substance, has entered the cornea, and some shopmate has attempted to remove it with a sharp-pointed stick or penknife or other pointed means. Nothing that is used has been even passably clean. The eye, when seen, is badly irritated from the manipulation more than from the foreign body, and it is only a special dispensation if it is not already infected.

Frequently, if steel, we find it has penetrated clear through the cornea, and manipulation may cause it to drop through into an-

* Read before the meeting of C. M. & St. P R. R. Surgeons, October 29, 1897.

terior chamber. In such cases a sharp spud should be passed through into anterior chamber behind the body, and thus hold it from dropping while it is being removed. These cases should be very thoroughly irrigated, and if the wound is near center of cornea, atropine should be used. In the cases of excessive irritation from foreign bodies, I have sometimes thought that a weak atropine solution had an anodyne effect that lasted longer than anything else, and if the irritation is excessive, confinement to a dimly-lighted or a darkened room is good practice. I cannot advise bandaging unless it is very light and lightly applied. I much prefer the prone position, with the eye gently closed, the lid furnishing the bandage, and the iced cloths or hot water applied over the lid.

If a foreign body has entered the eye, another element of danger has entered the case. If it has merely dropped into the anterior chamber it can often be extracted. If it is entangled in the iris, an iridectomy containing the foreign body must be done. If it has passed into and not through the lens, as sometimes, but not often, happens, a traumatic cataract results, and the foreign body may come out with the cataractous lens. These, however, are unusual, and very happy terminations of bodies entering the interior of the globe. Usually the foreign body goes clear through, and is either lost in the vitreous, or lodges somewhere in the background. I may be somewhat pessimistic, but I am free to confess that I have little confidence in an eye with a foreign body inside of the globe. If steel, the magnet may be used in the vitreous, but often with no success whatever, and there is almost always an infection of vitreous from the body.

Even if it proves, by becoming encapsulated, that it has not at once infected the eye, time shows continuous loss of visual power, the tension of the ball becomes subnormal, and enucleation becomes necessary, frequently on account of the fears for the condition of the sound eye. Even if fortunate enough to remove the foreign body, the infection has frequently already taken place, and destruction of eyeball results. I know of no class of injuries to eyes which are the cause of so much uneasiness or apprehension as foreign bodies within the globe.

In the locating of foreign bodies at times there are difficulties. If the body is very small, and, as sometimes happens, transparent, frequently the only evidence is the severe inflammatory symptoms. Transmitted light is the only means of successfully discovering the position, frequently, of the foreign object. No eye should be turned away, if congested, without a thorough search with transmitted light. It is only a short time ago that a railroad laborer presented himself with what appeared to be, on cursory examination, a small perforating ulcer of cornea, of about seven weeks' standing, following the receipt of a foreign body in the eye. The eye had been useless ever since. A thorough search of the diseased point revealed an infected ulceration with a small foreign body still in the bottom. After thoroughly cleaning out the diseased tissues, together with removing the foreign body and slightly cauterizing the infected spot to the bottom, the patient was discharged in five or six days. The company now have a suit on their hands, and it could all have been prevented by the simple process of illuminating the eye, and thus discovering and removing the foreign body at once.

As to local anæsthetics, theoretically, cocaine is injurious to corneal tissue, and especially where a tendency to ulceration already exists. In practice, however, during operative procedures of any kind, it is often of great use, and when not used too long does no harm. I would, under no circumstances, however, advise it for constant use. Eucaine is of benefit, but it is too irritating in sufficient strength to be anæsthetic. The new local anæsthetic, holocain, in a one per cent solution, is about as anæsthetic as a four or five per cent cocaine solution. It has no effect on the cornea, nor does it effect the accommodation.

WHEN SHALL WE ENUCLEATE?*

By R. F. Harper, M. D., Ozark, Ala.

The subject of enucleation is as apt to confront or come before the railway surgeon as any one else save the specialist. Let us remember that it is not necessary to remove every

*Read at eighth annual meeting of the Central of Georgia Railway Surgeons' Association, April 19, 1898.

wounded eye. There is no doubt in my mind that there have been many badly wounded eyes removed that could have been saved with some, if not perfect, vision, if they had been given a chance with the proper observance of surgical cleanliness and rest. Even an amblyopic eye with anything like natural appearance and normal shape is to be much preferred to an artificial eye or nothing at all. I am sure many surgeons go entirely too far fearing sympathetic ophthalmia.

I am frank to admit that sympathetic ophthalmia is a condition that we all should dread, but we must not lose sight of the fact that there are other remedies besides enucleation.

We should remember that enucleation does not invariably prevent sympathetic ophthalmia. We should also remember that the operation of enucleation is not without danger in every case, especially when operating for panophthalmitis. As the inflammatory process may extend on and set up a meningitis, or as I said before, the other eye may become involved after enucleation.

The indications looking to enucleation are: Malignant tumors, injuries, iridio-cyclitis, atrophy of the eyeball, and phthisis bulbi, when sympathetic ophthalmia threatens, glaucoma absolutum, ectasia of the eyeball, hemorrhage and cosmetic considerations (Fuchs).

Injuries are the only cases that come properly within the scope of the railway surgeons' consideration. The following are a few of the varieties that we are most apt to meet with, viz: Burns, lacerations, foreign bodies, penetrating wounds, concussions, dislocated lenses, etc. Most of these may be infected or non-infected according to the cause of the injury.

Burns are in most cases not infected, and if not deep enough to perforate, will seldom necessitate enucleation if kept clean. The greatest difficulty in treating burns of the eye, especially if the lids are involved, is to prevent adhesions and distortions. If the burn is sufficient to allow escape of lens and to distort the lids (and there is little hope of the lashes ever returning) you then should enucleate. If the lids are not involved and the contents of the ball have escaped let the stump remain if you have reasonable assurance that you have a clean wound, for a shell if worn will have far better motion with the stump than without it. But on the other hand if you are in doubt as to whether the wound is clean or not, and there are evidences of approaching panophthalmitis you should enucleate without delay.

Lacerations.—We are justified in enucleating in lacerated wounds, only when lacerated to the extent that vision and form can no longer be hoped for, also when there is or will be in all probability panophthalmitis. We should remember that we can replace the iris when protruding or cut it off and carefully and completely close the wound in the cornea or sclera, if by no other means we may use a suture even in the cornea.

Foreign Bodies.—Many can be removed, e. g., if iron or steel, with the magnet, but we seldom have good vision after the use of the magnet. If the foreign body is in the anterior chamber we can remove it in most cases, provided we are armed with the proper instruments. Sometimes foreign bodies remain in an eye for a long time with seemingly no bad results. But in such cases remember that neither eye is safe as long as either has a foreign body in it. We should always enucleate if we know that we have a foreign body that cannot be removed. Most cases of foreign bodies can and should be sent to an oculist, as the average surgeon is not armed with the proper instruments, neither is he expected to be. The X-ray is a great value in some cases, by locating the body.

Penetrating Wounds.—Much depends on the nature of the body that penetrates, and the damage done in the interior of the eye. If done with a clean instrument and not much disturbance in the interior of the eye we would expect to save the eye by closing wound and proper treatment. We can, and it is frequently necessary, to use a suture to close a perforating wound, especially when opening is sufficient to allow an escape of vitreous. We should not suture the sclera in the ciliary region. If there is a perforation in the ciliary region sufficient to allow an escape of vitreous, we should separate the conjunctiva from sclera far enough back to get a flap to extend over the perforation (having already removed the conjunctiva from opposite side of flap), and suture it to conjunctiva fitting it tightly and snugly over the perforation. Then with a compress and bandage we will be able to save the eye in many cases with fair if not perfect vision. A suture in the ciliary region will al-

most invariably set up great irritation and should never be done if any other alternative presents. If we know the instrument or substance penetrating the eye be septic, then with the first sign of inflammation we should enucleate promptly.

Concussions, Dislocated Lenses, Etc.—These are wounds that also occur often and when severe enough to cause considerable hemorrhage in the eye, especially if in the anterior chamber, present a most frightful appearance, and we will at a glance feel that enucleation is inevitable, but not so. With time and proper treatment the eye will in many cases clear up and with fair vision in most cases. All of these cases should have a chance at recovery. The concussion may be sufficient to produce secondary glaucoma, etc., then enucleation is called for in most cases. An eye with a dislocated lens in it is never safe. Remove the lens if you can, if not remove the eye.

Management.—Now, Gentlemen, in regard to treatment; we should observe strict asepsis and use antiseptics just as vigorously in injuries of the eye as any other line of surgery. And next to asepsis and antisepsis, if not first in the treatment of injuries of the eye is rest, absolute rest. It is just as essential that a deeply or severely wounded eye be kept quiet and at complete rest as it is for a fractured thigh. And to do this as a rule, after thoroughly cleansing, adjusting or suturing, etc., we should apply light compresses and bandage; put patient in bed in a dark room on light diet, and keep him there until the wound is healed. In some injuries the head should be kept high. Opiates, etc., to quiet pain if severe. The point that I wish to impress upon this body is that not every wounded eye should be removed; and that the greatest mistake made in the treatment of wounded eyes is in not keeping patient absolutely quiet. I know there are many instances in which it is too risky to take chances by waiting to see the result of injuries, and I am frank to admit that there are many instances where an eye should have been removed that was allowed to remain until too late to save the other.

In conclusion I wish to emphasize this point, that with absolute rest and proper treatment, you will find that sympathetic ophthalmia is not such a ghost as we have all been taught, and on the other hand you will seldom do an enucleation or see a case of sympathetic ophthalmia.

A CASE OF TETANUS.*

By H. B. McMaster, M. D., Waynesboro, Ga.

The most interesting feature in this report is the slow progress of the disease, course it ran and the manner of final termination. Being in a man weighing 315 pounds and about 40 years of age. I have been actively engaged in the practice of medicine for the past ten years, this being the first case of tetanus to develop in my work and in a patient whose family is one of the best in my county and of means. Of course I became very much interested and watched it closely. I was called to patient six days after he had received a very severe wound in right arm from a shot gun at short range, which entered inner side of right arm just below the elbow, ranging upward and outwards, carrying away fascia and fat to the extent of four inches, leaving muscles and deeper structures intact. I found wound very much charred and blackened, also sloughing with a strong odor of something wrong. The attending physicians thought the entire charge had passed over or through the fascia, which mistake most of us would have made from the general aspects of wound and especially after finding neither bone, deep muscles, blood vessels or nerves had suffered. I found him with upper arm very much swollen, exceedingly sensitive to touch and with deposits of blood in small splotches in deltoid region. This caused me at once to suspect foreign matter in that portion of arm. After careful preparation of myself and a very close examination of the wound, I found that there was a track leading from the elbow in the biceps into which I introduced my index finger about three inches, detecting something foreign and found it to be three gun wads and a few small bird shot. Realizing that I must have good drainage and suspecting a pus pocket forming higher up I cut down about one inch below the axilla, making an opening about two inches long. I found I was correct in my surmises, for as soon as the other track was reached pus escaped and a few more shot. I washed the entire track out with

*Read at eighth annual meeting of the Central of Georgia Railway Surgeons' Association, April 19, 1898.

bichloride solution and packed with iodoform gauze. Patient expressed himself as feeling much better and slept well that night.

This was on Wednesday night. Patient was brought to me on the following Friday afternoon, driving fifteen miles. I found wounds and patient in fairly good condition; swelling of upper arm gone down, and a great deal of the discoloration taken up. He reported that he felt very much better and I agreed with him that he was.

Everything went well until the following Monday afternoon, when he commenced to complain of stiffness of the jaws; my suspicion was at once aroused and as he was no better Tuesday afternoon I told his mother that I would like to have a consultation, and Dr. W. H. Doughty, Jr., of Augusta, was called on Wednesday morning. We decided to lay the wound open from the original wound to the one I had made, which was done, leaving a large gaping wound twelve to fourteen inches long, and you could have laid your hand down in it anywhere. All I found in the new wound was blackened or dark tissue, where I had dislodged the wads.

We kept a stream of permanganate of potash alternating with creolin flowing through this wound for an hour at the time, after irrigation would dry it and according to Tillmans, used a solution of nitrate of silver 5 grs. to the ounce of water, which was mopped over the entire wound and allowed to dry before covering. (I wish to say here that patient would invariably go to sleep during the dressing.) Thursday no improvement; general condition of wound good and the majority of the dead tissue sloughing out; Friday respiratory spasms commenced, which were of a mild nature. Saturday succeeded in getting P. D. and Co.'s anti-tetanic serum, which was used until I could get Gibier's from New York. I gave both a good and free trial, but my patient continued to grow worse and died Monday afternoon—eight days from the first onset that I had noticed.

His mother told me that Tuesday before I was called to him he was complaining of his jaws, but after the removal of the wads and free drainage he complained no more until the following Monday.

Now, there is a question that I would like to get some information on. Did I in this drainage and antiseptic treatment prevent the growth of the germs and in washing dislodge enough to prevent patient from a full charge of poison, or did he get infected after the opening was made and foreign matter removed? 'Tis the history of the majority of these cases to be taken off in forty-eight hours. I had never had any experience but with two other cases and those in hospital work which passed away in thirty-six to forty-eight hours. Under the serum treatment the rigidity of the muscles became more and more marked daily, but patient suffered more from spasms of respiratory center than elsewhere and died in one. With these spasms there was no great rigidity of muscles and especially of neck and back until the last twenty-four hours of life and really no typical opisthotonos.

Pulse rate was always high, ranging from 100 to 140, temperature below normal until the last few hours of life. Medicines used in treatment were chloral, bromides and other sedatives. We tried to use tartrate of iron and potash with iodide of potash, but he refused to take them, and consequently we had to desist.

My principal reasons for reporting this case are: (1) Tetanus is rather a rare disease in our southern climate. (2) The very slow progress the disease made. (3) To show that we cannot depend entirely on the new products to save life, such as anti-tetanic serum. I cannot think patient was in any way benefited by the serum, but to the contrary was injured by its use. The wounds had entirely cleaned off and I don't think I ever saw a more healthy granulating surface than he had when death called him.

University of Texas.

The Regents of the University of Texas have appropriated $46,000 for the medical college of Galveston.

Resignation.

The Texas Medical Journal states that Dr. R. H. L. Bibb, surgeon-in-chief of the Mexican National Railroad, has resigned the position of surgeon to the American Hospital in Mexico City and removed to Saltillo, his former home.

Dr. C. B. Stemen of Fort Wayne, Ind., was nominated for Congress by the Republicans of the twelfth district.

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NOTICE TO MEMBERS.

The program for the next meeting of the I. A. R. S. is now in course of preparation. All members who propose reading papers at this meeting are requested to send in the titles of their contributions to the Secretary at once.

THE PHYSICAL EXAMINATION OF RAILWAY EMPLOYES.

One of the most interesting and thoughtful papers read at the tenth annual convention was that of Dr. Henry F. Hoyt on "Observations Upon and Reasons for a More Complete Physical Examination of Railway Employes" (Railway Surgeon, iv, p. 51).

Dr. J. H. Ford, surgeon of the C. C. C. & St. L., read a paper on a similar subject before the Central Association of Railroad Officers. Dr. Ford's paper was published in the Railway Age and the Doctor states:

"The doctor who becomes familiar with railroads observes some things which to him, from a medical standpoint, are peculiar. He sees the track constantly under the observation of the chief engineer, with his trained band of assistants. The motive power and equipment has almost hourly inspection, and its superintendent is on the alert for new improvements or the betterment of the old. The transportation department uses every care to so operate the road as to avoid accidents and destruction of property. He wonders if, with all the anxiety, vigilance and striving after the ideal, which the up-to-date railroad man uses, he has not overlooked something. That is the personal equation in operating roads. It is pretty difficult after an accident, with torn-up track, wrecked equipment, and that sentiment of self-preservation which animates every breast, to fix the exact cause. Many wrecks, the cause of which has never been known, can be charged up to the personal equation—some defect in some operator.

"I recall a wreck to which I was called some few years ago, which on our arrival seemed inexplainable, but the cause developed on a trial for damages from an injured passenger. The section boss noticed a low joint on the outer side of a commencing curve at a small open culvert. They were going in for the night, and he made a mental note to return early in the morning and raise it. A convivial bout with some boon companions that evening dislodged the matter from his mind, with the resultant wreck. The section boss was first on the ground and raised the timbers up and put a shim under the timbers of the culvert where no one would see it. That night's dissipation cost the company over $15,000. Another case of personal observation was where a small furuncule or boil in the external auditory canal of a telegraph operator's ear caused a head-end collision, with the loss of one life and the sending another hobbling through a maimed and painful existence, and some $25,000 property loss to the company. Another, where a rear brakeman with inguinal hernia was sent hurriedly to flag an approaching train. His foot slipped off the end of a tie, his hernia slipped out from under his truss, he was unable to proceed, a

rear-end collision occurred, with large property loss, and a long list of damage suits from injured passengers. It is not necessary to multiply these cases, as you can all supply them from your own experiences.

"It has been only a few years since railroads paid any attention to the physical fitness of their employes, and this has only extended to vision and hearing. These, vision and hearing, have been discussed before you, and I will not take up your time except to remark, with all due deference to our worthy and competent trainmasters, that they have been given a very difficult task to perform. It is not that they do an injustice to any employe, for I know the employe has the right to appeal to a competent oculist, but the difficulty and danger of having the examinations as conducted is that many men who should not pass the examination slip by. All examinations of employes should be made, as in other departments of railroad service, by those whose training and experience have made them thoroughly competent to inspect the men. Every new man who enters the employ of the road should come in under the examination of a competent surgeon. He should be physically perfect; should not be over thirty years of age. This should be demanded by the company, not only that everything about the road should be as perfect as possible, but for the road's own protection. A man suffering from some ailment, however slight, is not capable of doing good service; he will not recover from an injury as quickly as one whose system is not handicapped by disease. Many a limb has been lost, and many thousands of dollars have been paid out for troubles that were inherent in the system and not the result of the accident. It is a right the traveling public has to demand that the human machine employed shall be as perfect as any other part of the equipment; should pass as rigid inspection. It is the duty of the management to the owners to protect their property, and they should be as accountable for loss through the personal equation if they allowed an imperfect employe to go over the road as if they allowed a defective engine or car."

As our contemporary remarks:

"Dr. Hoyt and Dr. Ford are two excellent authorities in their profession, and what they say should have weight with railway managers. But their arguments do not rest on professional knowledge alone; they appeal to the common sense of all men."

Translations.

Direct Subcutaneous Ruptures of Large Arteries With Consecutive Gangrene.

By Felix Lejars.

(Translated for the Railway Surgeon.)

We know that the great vessels are frequently involved in large lacerated wounds of the members, that the principal artery, and often its satellite veins, may be denuded, thrombosed, torn or ruptured. These injuries are not treated of here as they are usually combined with grave lacerations of the soft parts and great fractures of bone, and so give rise to questions of traumatic surgery, which are often debated. Nor do we treat of ruptures or arterial contusions which proceed from displacement of the fragments in fractures or of the articular extremities in dislocations.

Under this title of "direct subcutaneous ruptures" we include only those cases where the shock is exerted directly on the artery and leaves the skin, bones and joints intact, while it creates divers lesions of the arterial wall, which are most often evidenced by obliteration and consecutive gangrene. This is a very particular type of traumatism, the prognosis of which is nearly always grave and the treatment difficult. Let us add that the pathogeny of these gangrenes is extremely interesting, their evolution sometimes strange and their appearance late. Again, their unexpected behavior may create painful responsibilities for the surgeon.

Case.—Subcutaneous Attrition of the Right Brachial Artery from Passage of a Cartwheel —Obliteration of the Artery—Dry Gangrene of the Fingers—Late Intervention—Cure.

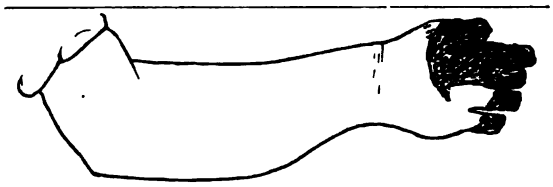
A man of 38, a workman in vigorous health, was knocked down on February 21 by a loaded cart, the two wheels passing over his right arm and his legs. He lost consciousness and was brought to the Beaujon Hospital, where I examined him two hours after

the accident. At this time he was in a state of disquieting collapse, no trace of visceral injury could be found, however; consciousness had returned and the limbs retained their mobility. I wish to state here that saline infusions rendered us great service; nearly two quarts were injected. Apart from the intense shock the lesions were confined to two contused wounds in front of the knees, a slight sprain of the left instep and the arterial trauma about to be described. Neither dislocation nor fracture was present.

It was noticeable at once that there was complete absence of the right radial pulse; the ulnar artery was not beating either. The hand was pale, cold, immobile, completely insensible, the fingers half flexed. Sensation was present at the middle of the forearm, but the skin remained cold as far as the bend of the elbow. No pulsation could be detected in the brachial artery at the elbow, and on the inner side of the biceps could be felt an elongated œdematous area, which extended to the middle third of the arm; the artery could be felt beating above this area, so it appeared evident there was a lesion of the brachial artery above the elbow. I may add that there was no appearance of extravasation or of diffuse aneurism, and that the tumefied ring surrounding the vessels seemed due only to a hematoma of the sheath.

The hand, forearm and arm were enveloped in a thick layer of cotton and great attention paid to the general state of depression, which continued alarming. On the morning of the second day the hand had regained a little warmth, at least over the metacarpal area, but it remained insensible. An ecchymosis had appeared on the inner side of the arm and elbow, the peri articular swelling was firmer, but had not increased in size. Pulsations were still absent over the area indicated, shock was still marked and the saline injections were continued, two quarts daily. The situation remained unchanged for the next three days, general depression was very marked, paleness extreme, though there was no indication of any visceral lesion. Two quarts of Hayem's serum were injected under the skin daily. It was not until the fifth day that the prolonged shock appeared to definitely subside, the pulse regained its volume, respiration was easy, and the patient commenced to eat. The right hand and forearm had nearly the same appearance. Absence of the pulse below the elbow, the paleness, coldness and insensibility persisted. Large warm baths were used in addition to the cotton dressings, together with prudent massage of the forearm.

On the 27th the hand was a little warmer, the insensibility was still complete, the fingers had regained some movement, the inner side of the arm was the seat of acute pains, which prevented sleep. March 3, the hand is almost warm, and there is some perspiration. The fingers are still cold and insensibility is not changed; it is absolute as far as the wrist. March 8, fingers violet, skin dry and wrinkled over their whole area. A little fever has been noted for some days, no doubt due to the wound of the left knee, the edges of which were sloughing. March 11, large blisters have appeared on the back of the hand, the fingers are getting black at the tips. During the month following the whole hand seemed lost. Toward the middle of April the question of amputation



of the forearm was discussed, but not carried out, as there was no fever or septic phenomena and the patient's general condition had become very good. The hand and forearm were kept carefully wrapped in antiseptic compresses. By April 28 the line of demarcation commenced to form and the gangrenous zone comprised the whole extent of the index and middle fingers, and a large patch of skin corresponding to the lower third of the second and third metacarpals, the second phalanx of the thumb, the third phalanx of the ring finger and half of the second, the two last phalanges of the little finger and half of the first. All these gangrenous parts are dry, black and horny; the rest of the hand is slightly sensible; the circulation appears to be carried on fairly well.

I excised the gangrenous fingers on the 14th, by which time the separation was well advanced. The anterior segments of the second and third metacarpal bones were removed by a chisel, the wound was covered with a palma' flap. On the other fingers the

tissues were reflected back and the bone divided with the chisel in order to leave as much support as possible.

The operation was not followed by any particular incident, but the cicatrix remained granular and some points healed very slowly. At the present time the skin of the hand is soft and red, but incompletely mobile. In time it will no doubt regain its normal aspect. The stump of the thumb which remains, by opposing the segments of the fingers, will be much more useful than a prothetic apparatus.

The radial pulse reappeared four months after the operation. It is still feeble. Above the elbow a sort of vertical cord can be clearly felt, which is strewn with many nodules and seems to be the obliterated artery. The extravasated blood was slowly absorbed, and by the end of six weeks was not perceptible under the skin.

Similar cases are not rare and I have been able to collect thirty-four, which served as the basis for the following study:

ETIOLOGY.

The arteries of the lower limb are most often involved, especially the popliteal and the femoral (11 cases of each). In the upper limb we have only found four cases involving the brachial, besides our own—those of Cusco, Moré, Hulke and Lawson. Other interesting cases are the common iliac (Tillaux), the external iliac (Brummer), axillary (Holmes), radial and ulnar (Rosenberger), and common carotid (Verneuil). Certain anatomical conditions explain the frequency of occurrence of the lesion in this or that artery, or at given points. The existence of a subjacent bony plane plays an important rôle in the mechanism of a rupture, whether partial or complete, e. g., the inner surface of the humerus, of the femur, the superior strait (common iliac), the posterior border of the femur (popliteal), etc.

It is nearly always caused by grave traumatisms, which usually fall under two heads—a direct violent shock acting directly on the vessel, a kick from a horse, being caught between the bumpers, being struck by the shaft or pole of a wagon (in the iliac fossa, Tillaux's case). More often from the intense pressure of a very heavy body passing over the limb, a wagon-wheel for instance. In Potherat's case a cask of wine rolled the whole length of the thigh.

It may be observed that owing to the nature and gravity of these accidents they have thus far only been observed in males of all ages, but generally adults. The last remark is not without interest, for it is often stated that some pre-existing alteration of the arterial wall, for instance, atheroma is an almost indispensable condition for these ruptures. However, examination of the specimens has shown that the wall is sound. This is not surprising when we remember that the most frequent lesion of this subcutaneous attrition—the rupture of the inner and middle tunics is the same as that produced by the ligation of arteries.

(TO BE CONTINUED.)

Extracts and Abstracts.

Treatment of Wounds.

By J. E. Summers, Jr., M. D., Omaha.

Wounds Made into Infected Tissues.—When it is necessary to make incisions through apparently healthy tissues in order to reach infected areas, it is usually best to treat the resulting wound as one which must repair, in part at least, by granulation with the formation of pus. Should the operator feel sure that all the foci of suppuration have been removed, even if the wound has been more or less soiled by pus during the excision, after thorough disinfection it may follow that by accurate suture, complete repair will take place, union being by first intention. However, such a result is rather exceptional. Usually there will be a greater or less failure of the primary reparative process, and some suppuration follow. Therefore it is wiser to only close such wounds in part, leaving at the most dependent place an opening extending from the bottom to the surface. A drain, either of rubber tubing or iodoform gauze, should be inserted, and if after forty-eight hours there is complete evidence of the absence of inflammation of the wound, the drain ought to be removed. This drain acts as a safety valve, should the effort to obtain primary repair prove futile. In either case, the dressings and treatment should be as indicated for non-infected wounds, or those made by the surgeon in which a faulty technique was rewarded by more or less infection.

If an incision is carried directly through inflamed tissues, although there is an absence of surface suppuration, the prime object of the use of the knife would be lost unless the wound

were kept open. These incisions, whether single or multiple, long or short, are made for the purpose of relieving tension, and for the evacuation of fluids whose retention may, in a circumscribed or spreading fashion, tend to cause pain, prolong illness, or even threaten limb or life. Therefore, free drainage must always be employed, and the greatest care is essential, that while a reparative process is supplanting the inflammatory one in the infected tissues, no hindrance should be allowed to the free escape of all secretions from the deepest recesses to the skin edge.

In acute circumscribed inflammations, with the more or less complete breaking down of all of the tissues involved, it is usually sufficient, after an incision, to gentle irrigate the wound cavity with an antiseptic solution of medium strength (bichloride, 1-2,000) and drain by using a light iodoform gauze packing, the discharges being received into a moist antiseptic dressing protected by some impervious covering. The dressing should be changed daily until all signs of inflammation have disappeared; usually in from two to five days. Then it is better to use as a drainage material a strip of iodoform gauze soaked in castor oil, or in castor oil and balsam Peru, 5 to 6 per cent of the latter. Sterile gauze is usually quite as efficient as the iodoform gauze, and much cheaper, but generally it may be stated that until granulations begin to form for repair, iodoform gauze is better. A good sized piece of sterile gauze soaked in the oil dressing is placed over the end of the gauze drain, and over this is arranged some oiled paper or rubber tissue, and over all, cotton and a bandage. This dressing need not be changed oftener than every second or third day. Irrigation is unnecessary, as there is nothing to wash away. All of the discharge finds its escape along the drain into the medicated dressing under the impervious protective. There is no drying out and sticking of the dressings so that discharges are pent up and decompose in the wound. Gradually the wound fills from the bottom, the dressing should become smaller in bulk, and as the granulations reach the surface of the incision, it should be allowed to close. This may be aided often by drawing the edges towards one another, using adhesive plaster. Before applying the plaster the wound must be protected with some light non-irritating antiseptic dressing. Boracic acid ointment of about one-fourth strength spread on lint or sterile gauze is an excellent dressing at this stage of the wound repair.

In infectious inflammations involving considerable areas, as, for instance, in more or less diffuse cellulitis of the extremities, or of the parts involved in extravasation of urine, the only hope of limiting the spread of the inflammatory process is to establish free drainage by suitable incisions. Such wounds have to be kept open, using large fenestrated rubber drainage tubes or gauze. The rubber tubing is preferable, and often it is good practice to connect well placed openings by the same piece of tubing. Gentle pressure and irrigation with some antiseptic solution is useful to remove pus and debris. Little good is to be expected from the irrigating fluid except its mechanical action. So, usually, it is best to limit its interference with repair to the purposes mentioned. Copious moist antiseptic dressings are essential, and these must be removed every twelve to twenty-four hours until it is evident that inflammation has ceased to spread and that repair is well established. In addition to the tubing, gauze may also be employed to aid in keeping the incisions from closing too soon. When, as a result of the incisions, dressings, etc., the inflammation has become a local one, the conduct of the after treatment should be along the same lines as advised in acute circumscribed inflammations. It may be evident, from the virulence of the inflammation, that more severe measures of treatment are necessary, either after the line of practice for the management of suppurative cellular inflammation has failed to stay its spread, or where from the first simple incisions for the purpose of drainage were recognizedly insufficient.

Under such circumstances, it is often the best practice to lay the parts wide open by free incisions, not only with the purpose of gaining absolutely open drainage, but also an opportunity to mop the infected tissues with liquid carbolic acid or tincture of iodine (possibly somewhat diluted with alcohol). These strong antiseptic agents will usually penetrate so as to destroy the infecting element, and as a result establish a reparative in the place of an infective process. Iodoform gauze is the best material to lightly pack into these wounds, and the packing and antiseptic dressings should be changed once or twice every twenty-four hours until the discharge becomes moderate in amount and healthy in character. Campho-phenique gauze is a valuable drainage material. It is antiseptic, anæsthetic, and drains a little better than iodoform gauze. Occasionally incisions for the relief of the tension and spread of cellular inflammation are made so late that intermuscular planes have become invaded and pus has found its way towards parts at some distance from the surface. Such circumstances will be discovered by the exploring finger, always introduced into the incisions for the purpose of ascertaining whether or not this condition is present. When so, the drains must be placed so as to reach the bottom of the infection, and perhaps, in order to do this and perfect the drainage, it may become necessary to make dependent openings through

healthy tissues. This is most commonly necessary in the extremities when so-called "through and through drainage" is established. In freely opened septic wounds, irrigation at each dressing is required to loosen and help wash away sloughs formed as a result of the inflammatory and powerful antiseptics employed.

As the repair progresses, drainage tubes should be shortened. Often tubes of small caliber can be substituted for the larger ones. These extensive suppurating processes are very depressing, and the system should be supported by alcohol, strychnine, and forced feeding. Opium should be given to control pain, and in the later periods of the infection to check diarrhœa.

Wounds Not Inflicted by the Surgeon.—When accidental wounds are of the nature of incised wounds, they are treated much the same as are wounds made by the surgeon through noninfected tissues. The surface about the wound is prepared by the method given for an antiseptic operation. In addition, the lips of the wound should be separated and the raw surface disinfected. Great care must be taken to remove any foreign material, and especially should this be insisted upon if the circumstances of the injury point towards the possibility of street or stable dirt having gained entrance into the wound, because of the danger of the presence of the tetanus bacillus in such dirt. Under these conditions, the disinfection should be most thorough. Alcohol, liquid carbolic acid, and tincture of iodine are among the most useful agents for this disinfection. If the surgeon is reasonably certain that he has a clean wound to deal with, it ought to be sutured and some suitable antiseptic dressing applied. Under all other circumstances it is wiser to leave the wound, in part, at least, unsutured. An antiseptic dressing must be used. If after a few days there is complete absence of inflammation, the wound may be closed by suture or the edges approximated with adhesive plaster drawn over antiseptic gauze applied next to the wound. If infection has taken place, the treatment should be as already described for similar conditions.

The nature of an accidental (possibly homicidal or suicidal) incised wound may, from its anatomical location, prevent any primary attempt at cleanliness, because of threatened danger to life from hemorrhage, but after this has been overcome, thorough antiseptic details should be followed. If nerve trunks or muscles have been divided, the ends should be carefully sewed to their proper fellows before closing the wound. These kind of complicated incised wounds are most often seen near joints where muscles, tendons, and nerves are situated in shallow spaces between the skin and the bones. Incised wounds of special parts of the body must be dealt with according to the recognized surgery of the particular structures or organs involved. Categorically speaking, it may be stated that the control of hemorrhage should be the first object. The second should be the removal of all foreign substances, as dirt from without, or, in case of a wound of the intestine, soiling from within. Third, after thoroughly cleansing, all damage should be most painstakingly repaired. These must be dealt with before any attempt at closure of the outside wound is undertaken.

Simple contusions, or bruises, are best treatey by hot water, used by immersion if the injury is of an extremity. When the head or trunk is the locality injured, cloths wrung out of hot water and frequently changed are very effective. This treatment lessens swelling, checks extravasation of blood, and relieves pain. After the first twenty-four hours, gentle massage may be begun and continued daily. A flannel bandage applied directly to the skin, or over cotton or lamb's wool, is effective in giving support and in aiding absorption of extravasated blood and irritation exudate.

Lacerated wounds, which may be more or less contused or crushed, are of the most serious class of injuries the surgeon is called upon to treat. The extent of destruction of both soft parts and bones is not uncommonly so great that the shock to the nervous system is overwhelming, and causes death either immediately or within a few hours. Fortunately mild tearing and bruising of the tissues is the rule, the more serious injuries resulting from entanglement in heavy machinery, or the mutilation of limbs by car wheels.

Lacerated wounds, whatever their apparent kind, require an especial examination. Before, however, expending any time further than to perhaps remove the clothing so as to gather a respectable idea of the character of the injury, the general condition of the patient should be investigated. If there is marked derangement of the nervous system, evidenced by a small, unnaturally rapid pulse, partial unconsciousness, or an exhilarated state of "I'm all right," clammy skin, and pale, ashen face, restorative measures are necessary before any attention to the injury itself is undertaken, unless hemorrhage is going on. When there is any hemorrhage, even though moderate in amount, it should be checked, catching the bleeding vessel or vessels with artery clamps will suffice for moderate superficial bleeding, but when the blood comes from several vessels of large size and many small vessels, as may be the case in some injuries of the extremities, the best practice is to apply an elastic tourniquet so as to control the bleeding. If the patient's general condition is so bad that a further examination might add to the shock, it

is wrong to interfere. The shorter the distance a patient suffering with severe shock is moved from the place of accident to where he may receive first aid the better. The essential restoratives are—after checking bleeding and applying some protective antiseptic dressing—absolute quiet, artificial heat, the administration of drugs. Desperate cases require nice judgment, and in the administration of drugs to combat shock, the desire to do something often warps one's judgment.

For many years alcohol and opium were the sheet anchors in the treatment of shock, but of late alcohol is being discredited and not much is heard of opium. The hypodermic administration of strychnia is the remedy most relied upon, and in case of much loss of blood, its volume is replaced, in part at least, by the intravenous injection of hot normal salt solution. The strychnia is given in doses of 1-30 gr. to 1-10 gr., repeated every one to four hours, Tr. digitalis, 10 m., 30 m. may be given hypodermically. Nitroglycerine, 1-100 gr., and atropia, 1-100 gr. are often used. It is the opinion of the writer that opium in the form of morphine is useful, in fact, a sine qua non in bringing about an equilibrium in the nervous system, it is also a powerful stimulant. Lives are occasionally sacrificed by the administration of too many and too powerful "heart stimulants." Absolute quiet brought about by favorable surroundings and the use of just enough morphine to sooth the disordered nervous system are of more value than all of the so-called heart stimulants. Strychnia acts as a stimulant to the respiratory and circulatory centers; it also has a direct stimulating effect upon the heart muscle, but strychnine acts upon the vaso motor nerves and contracts the arteries. It is often observed that the pulse of shock indicates the presence of an abnormally small amount of blood in the arteries; the superficial veins indicate the presence of a full quantity of blood in these veins, and it is reasonably sure that the abdominal veins are pretty full. Although strychnia does not stimulate the heart, unless given in a well-guarded manner, it may so contract the arteries as to increase the accumulation of blood in the veins and overwhelm the right heart. Therefore, when strychnia is given in large doses it should be administered in conjunction with nitroglycerine or belladonna, preferably the latter if the skin is cool and clammy. Digitalis possesses, in a measure, the properties of strychnia; its action upon the blood vessels is less marked, however, and may often, with advantage, be substituted for it. Digitalis helps to unload excrementitious materials by its action upon the kidneys, and thus adds to its usefulness.

Contused and lacerated wounds, whatever their degree, require careful antiseptic digital examination to determine the extent of injury to the soft parts, and often, also, to the bones. Most any kind of grease, dirt or foreign substance may have been forced into the deeper recesses of the wound, so the future behavior of the wound will depend upon our ability to remove all such material and thoroughly disinfect. In such wounds, except those of a trivial kind, drainage must be established. Whenever there is extensive laceration and disturbance of the soft parts, especially if bones are broken, several openings ought to be arranged and rubber tubing placed to provide for a free escape of hemorrhagic and exudative fluids. If the surgeon's efforts to remove all infection producing substances have been unsuccessful, the drainage tubes afford an escape of inflammatory products and the danger of constitutional poisoning and local inflammatory destruction are reduced. Copious irrigations with some strong antiseptic fluid, as bichloride 1-500, 1-1000, or carbolic acid, 1-20, is demanded in the first preparation of the wound. Later, milder irrigating solutions can be used. Antiseptic dressings should envelope these wounds, and even when bones are uninjured, it is often wise to employ splints when the wounds are of the extremities, especially if in close proximity to joints. The quieter the parts are kept the quicker the repair and more circumscribed any inflammatory condition that may arise. Sometimes it is good practice to cut away certain soft parts, whose vitality is destroyed, but unless this tissue is merely hanging by shreds, it is wisdom to wait until nature has demonstrated positively the death of tissue. When, from the nature of the crushing force, combined with a careful examination of a resulting wounding of an extremity, it is positively certain that the blood supply is totally destroyed, amputation is demanded, and this operation ought to be done as soon as reaction from shock is established. This refers to profound shock, which nearly always exists when more than one extremity is crushed or the injury is near the trunk, especially of the lower extremity. When shock is not very marked and an extremity, or extremities, hopelessly devitalized, the sooner amputation is done the better, as the removal of such parts lessens nerve irritation. Moreover, the danger of septic infection is reduced. If the blood supply left after one of these injuries is sufficient to keep up the vitality of an extremity, it should never be amputated as a primary procedure. With our improved modern antiseptic surgery, the possibilities of repair are almost unlimited. In case of failure to preserve a useful limb, this may be removed as an operation of election. There is a form of lacerated wound sometimes appearing of little consequence, but often followed by tetanus. It is generally a Fourth of July accident and

follows the entrance of small pieces of the cap used on "toy" pistols, parts of fire-crackers, etc. Wounds caused in this way should be freely incised so as to get at the deepest recesses and remove every particle of foreign substance discoverable. They should then be disinfected with pure carbolic acid and alcohol and kept open with iodoform gauze packing. The only safe way to treat these wounds is upon the open method, repair being by granulation. It ought to be borne in mind that any injury which leaves a foreign body other than a bullet in the tissues is liable to be followed by tetanus.

Punctured wounds, whether from their anatomical location, they involve joints, organs of the chest and abdomen, the brain, or merely soft parts, are serious injuries. When the inflicting instrument happens to be a clean one the wound is less likely to be dangerous than any other kind of wound, provided no vital organ is injured. Sometimes these wounds cause concealed injury, such as opening into an intestine, or bladder, and the secondary inflammation may be fatal. The chief danger of punctured wounds lies in the fact that infective germs are introduced with the entering instrument, and the nature of the wound tends to retain these germs, so that they can gain a firm foothold. Wounds which bleed freely and allow of an open escape of blood are not usually infected at the time of their causation. Flowing blood does not favor germ implantation and growth. Punctured wounds, unless a large vessel is injured in the direct course of the puncturing instrument, seldom bleed much. What bleeding does take place usually extravasates around the track of the wound; therefore any germs which enter at the time of injury are securely placed for growth.

Punctured wounds are met with most commonly in the feet and hands and are often followed by serious consequences. A deep-seated suppuration may be set up, commencing in the aponeuroses, deeper connective tissue or tendon sheaths, and because of the resisting structure of the anatomical arrangement, suppuration cannot approach the surface until extensive involvement, even destruction of, not only the soft parts, but also the bones has taken place. There is invariably great pain, greater or less swelling with dusky redness. The fingers or toes soon lose their motility, likewise the wrist, or even the ankle. If active surgical interference is not instituted early contraction of the tendons and palmar or plantar aponeurosis follows with permanent disability. In neglected cases, suppuration may extend upward considerable distances. High fever is the rule, and even such a grade of general infection may occur as to cause death.

The proper treatment of this form of inflammation is by early free incision; the knife must be carried to the bottom of the infection and gauze, or tubular drainage, instituted. Sometimes several incisions are necessary. In using the knife, care should be taken not to divide tendons or the arterial arches. These latter, however, are of minor importance. After dividing the more superficial parts, the finger, or some blunt instrument, may be used to reach and open up the deeper parts. Incisions should be directed in the long axes of the tendons, never at an angle.

These inflammations not infrequently result from slight superficial abrasions sufficient to allow of the entrance of germs. Again, they may follow bruises without visible breaking of the skin. This is explained by the fact that the bruise results in a circumscribed lowering of the vitality of the tissues, and any germs capable of exciting inflammation which may be present in the circulatory or lymphatic channels in this locality, have an easy prey, the normal resistance to germ action being overcome by the lessened vitality caused by the bruise.

The treatment of all contused, lacerated, and punctured wounds belongs strictly to antiseptic and not aseptic, surgery.—West. M. Rev.

On Infiltration Anesthesia.

By Dr. Carl Ludwig Schleich.

In 1891 I began my studies on the effects of various soluble substances on the nerve papilli on my own skin and of that of my assistants. My reason for making these experiments was the relative frequency of cases of poisoning—though but of short duration and slight intensity—among those of my patients who had been operated upon under the method of producing cocaine anesthesia then in use. At that time, out of ten operations, it was common to meet with from five to eight cases of slight symptoms of dyspnœa, jactitation, palpitation of the heart, and collapse. Although none of these were sufficiently well marked to be alarming, they existed as disturbing sequences of local anesthesia, which it was my hope to avoid. My experiments were directed toward finding, if possible, a method of employing cocaine in combination with other substances which would be free from these annoying and not always dangerous after-effects.

For this purpose it was necessary to determine the minimum of action of this anesthetic "par excellence," and this could only be done by experiments upon human beings, those upon animals furnishing—as is so often the case in the more delicate questions of nerve physiology—only uncertain and approximate results. I decided, therefore, to inject the substances to be examined into, not under, the tissue of my own cutis, in order to study their

effect on the delicate and sensitive nerve-papilli. The result was surprising. We found that solutions of cocaine 100 per cent weaker than the usual strength (2 to 5 per cent) produced complete anesthesia and analgesia within the area of injection, and also that, apart from a slight burning sensation at the moment of injection, distilled water alone could produce complete anesthesia and analgesia within the wheal.

As the result of further investigations, we discovered the important fact that the physiological chloride of sodium solution exercised no influence whatever upon the sensibility of the skin saturated with it, but that, on the other hand, a 0.2 per cent solution of chloride of sodium produced complete anesthesia of the wheal without noticeable sensation at the moment of injection. A combination of the solution of chloride of sodium (0.2 per cent) with cocaine resulted in the discovery that dilutions of cocaine of 1 to 10,000, which could not have been injected painlessly in combination with water, produced complete anesthesia when injected into the wheal in combination with the chloride of sodium solution.

I wish here to state briefly that a great number of compounds, such as methyl violet, caffeine, carbolic acid, antipyrin, etc., will produce as complete an anesthetic wheal as does cocaine and chloride of sodium; and that even morphine in almost homœopathically small doses possesses this power, notwithstanding the universally accepted teaching to the contrary.

My experiments demonstrated the fact that a focus of anesthesia could not be produced by the cocaine solutions containing 2 to 5 per cent of cocaine up to that time in use, because the limits of autointoxication of from 0.05 to 0.08 were reached too soon; and further, that by means of so considerable a reduction of the strength of the anesthetic and a corresponding increase of the quantity employed, the cocaine anesthesia might assume unlooked for proportions. Briefly: I found that with my solutions of 1 to 1,000 or 1 to 5,000 I could anesthetize a far larger area of the body without reaching the limit of intoxication than I could with dilutions of 2 to 100 or 5 to 100.

The outlook was very encouraging, since it promised to make narcosis unnecessary in a large number of cases. However slight we may deem the danger of narcosis, no one will deny that at the very least it is attended with disagreeable consequences which it is to the interest of both physician and patient to avoid. I have made it a rule never to perform an operation under narcosis which can be done under infiltration anesthesia. If we compare those cases which have been operated upon under narcosis, although with the greatest technical skill, with those done under infiltration anesthesia, we can feel no doubt as to which of them is preferable. Of course, thorough knowledge of the technique of the process must first be acquired. It has been my habit to fully demonstrate my method to all my students, among whom I have always been happy to find many American physicians, and I avail myself of the opportunity to describe here some of the technical points which seem to me to be of the utmost importance in the practice of my method of producing anesthesia.

The technical process is always the same, viz., the formation by means of my solutions of an artificial œdema of the whole area within which we are to operate. The entire surface should, if possible, be saturated with the solution in order that the operation may be completed without further injections. It is above all things essential to make the first experiments in healthy tissue; only by this means can success be attained in completely anesthetizing inflamed tissue.

For example, take the case of an atheroma and of a foreign body. The first may be located in the scalp, the latter a splinter of steel which has penetrated deeply over the styloid process through the soft parts into the bone.

First let us consider an atheroma the size of an apple. After cleansing and shaving, I begin by applying ethylchloride to every part of the convex-shaped tumor, following the line of intended incision. A portion of skin of the size of a bean becomes white and freezes. Into this frozen area the needle of a syringe containing five grams of solution No. 2 (see formulas given later on) is introduced horizontally as far as the top of the opening of the canula, so that the point of the needle rests under the cutis without penetrating into the fatty tissue. If I may now press the piston of the syringe, allowing the fluid to flow beneath the skin, there is formed an anemic, slightly raised focus of injection called the "wheal," which may be increased to any size by further pressure on the piston. When it has attained the size of a flea-bite, I withdraw the syringe and reinsert it at the periphery but still within the area of the wheal, a little further in the direction of the intended incision, and again allow the fluid to flow. In this way the original wheal is extended in the line of the intended incision, the needle being repeatedly withdrawn and reinserted until the anesthetized area corresponds in size to the skin covering the tumor. All folds of the skin caused by the stretching of the tumor must be smoothed out as much as possible, so as to allow the advancing fluid to penetrate a little beyond the fold of the skin into that part which is not elevated. The superficial area of incision thus prepared, the anesthetizing of the subcutaneous connective tissue is accomplished by advancing the needle, under continuous flow of

the anesthetic, from the anterior to the posterior part of the tumor beneath the skin down to the periosteum. It does no harm if the needle encounters the resistance of the bone. Five grams of the fluid equally distributed on all sides into the connective tissue around the tumor are sufficient. In the same manner, the fluid must be injected from the top on all sides between the skin and the tumor. Great care must be taken not to inject it directly into the contents of the tumor, because on that case increase of pressure in all directions may cause pain. By producing edema of the tissue between the skin and the contents, the whole tumor becomes anemic-white, and can be incised and enucleated.

If these technical rules are observed, the operation may be painlessly performed at once. Should pain be felt during extirpation of the tumor, more fluid must be injected through bent needles around the tumor and under its base, until enucleation can be performed without the slightest pain.

In our second example, a small wound may be perceptible above the processus styloidus radii. The patient, we will say, describes the splinter of steel as about an inch long and as thick as a match, but it cannot be felt through the skin. After thorough cleansing of the surrounding parts, a wheal is formed about 3 cm. above the wound. The needle is inserted, under continuous flow of the anesthetic, as far as the periosteum. With the needle pressed firmly against the bone, about five grams of the fluid are injected, the needle being gradually advanced along the bone as far as the area covered by the wound. Consequently, from this first wheal the subcutaneous connective tissue is permeated with the fluid to about the size of a walnut, and finally also the skin in the line of the wound and around it is endermically saturated.

A cut is now made directly to the periosteum. The wound line is in the direction of the edge of the styloid process, somewhat toward the dorsal part. For this reason, one longitudinal incision is not sufficient; in order to afford space enough, a second T-shaped incision must be made transversely to the line of the wound. This is done after forming another line of wheals perpendicular to the first, beginning at the anterior edge of the skin and reaching the point where the foreign body is assumed to be lodged. If the incisions are made in the manner indicated, it is a simple matter, by means of sharp hooks, to obtain sufficient space to determine the location of the foreign body. If the latter has penetrated under the periosteum into the bone, a section of the periosteum and the lamellae may be infiltrated by renewed firm pressure of the canula against the substance of the bone, and repeated pressure of the piston. There is no doubt as to the possibility of introducing a sufficient quantity of fluid through the Haversian canals into the substance of the bone. Experiments with methyl violet solutions upon the cadaver and hundreds of experiments on living beings have proved the truth of this theory.

If we completely inject a bone like the metacarpus pollicis with infiltration solutions and saturate it with fluid in a line perpendicular to its line of direction, by means of firm pressure, we invariably find during the succeeding resection or amputation that entire painlessness results from the artificial œdema of the marrow of the bone which has been generated by the periosteal infiltration. Experiment easily proves, also, that slightly colored solutions can be infiltrated beneath the periosteum through the bony covering into the marrow. Briefly: It is possible so to anesthetize by infiltration the substantia eburnea of a bone that a foreign body can be painlessly removed from the bony covering. I have successfully removed a large number of such splinters, needles, balls, nails, etc., and always with the consent of my patient. The sutures can ordinarily be made without renewed infiltration, the duration of painlessness being more than twenty-five minutes.

For a fine example, we will take a furuncle in the neck the size of a walnut, in order to illustrate its anesthetization for the purpose of excision of all morbid parts. It is much more difficult to anesthetize an inflamed area, because of the larger space which it is necessary to infiltrate. On the other hand, the injection is more likely to be successful on account of the larger size of the lymphatic ducts in hyperemic portions of the body. The furuncle which is to be operated upon may be located in the back of the neck. To produce anesthesia we use solution No. 1 (see end of article), at least for the first injection. The spray should be applied to the healthy skin for a space at least three finger widths in extent beyond every part which is inflamed and reddened. At first—as in every case—a wheal should be produced. Through this the needle is introduced directly under the base of the furuncle and pointed towards the fascia and the sheath of the muscle, but under no circumstances should it be allowed to penetrate into the pus focus itself.

Injection of five to eight grams of solution No. 1 beneath the base of the inflamed tissue is made for the purpose of flooding the under part of the mass of extremely hardened tissue with the anesthetic fluid, so that those nerves which run backward through the bottom of the diseased tissue can be primarily excluded. Only experience and a thorough pathological knowledge of the individual character of each case can teach us when this point is reached. When this flooding of the under part of the tumor has been properly done—and only then—

the first wheal is raised, and gradually the whole surface of the furuncle is saturated with the anesthetic fluid. Afterwards the soft central core may be œdematized with solution No. 2.

Cross incisions may now be freely made, and all the involved parts excised. In case pain attends the filling of the cavity with the fluid, injections of solution No. 1 should be repeated until increase of pressure within the inflamed focus no longer produces pain backward through the base. The surgeon who performs many dozens of such operations, as the author has done, gradually acquires by practice such skill that in every case we can produce complete anesthesia at the first attempt.

As to the utility of my method, there can no longer exist any doubt, since such notable authorities as Mickuliez, von Bruns, Prof. Bier, E. von Bergmann and von Hecker have written in favor of it in Germany. Personally I am convinced, however, that according to the individuality of the operator, some will be more inclined to adopt my method than others. Even though we may not reach a final conclusion as to the limits of its application, the time will soon come when no one will be able to operate by any other method. Everyone who begins his studies with simple cases and acquires a certain technique with them before he undertakes more complicated operations, will soon discover that this method is a most decided step in advance in the art of operating without pain and danger.

This is, then, essentially the basis of my method. It is quite evident that this necessitates an entire change from the hitherto employed method of producing anesthesia which was founded by M. Reclus (Paris), its honored master, for the reason that it demands a different formula for each operation. In this change of technique, which naturally must be carefully acquired, lies one of the principal obstacles to the rapid adoption of my method. I have gladly availed myself of the privilege of seeing for the first time one of my articles published in an American journal, and to most gratefully acknowledge that it was by American colleagues, especially Drs. Würdermann and Parvin, that my method was first submitted to an exact and practical test. I desire to take this opportunity of thanking those gentlemen most sincerely. It was in consequence of their American publications that my method was in extensive use in that country before it had attracted any notice in my native land. To my American colleagues I am indebted even for the favor which it won later in Germany from many prominent medical authorities. Their service to the advance of science is, for that reason, as great as my own.

In spite of all the opposition of my German colleagues, I persevered, and transformed the technique of local anesthesia.

The following are my three solutions for infiltration anesthesia:

The following are my three solutions for infiltration anæsthesia:

	No. 1		No. 2		No. 3	
		Grains.		Grains.		Grains.
Cocaine hydrochlorate	0.2	3.09	0.1	1.55	0.01	0.155
Morphine "	0.025	0.386	0.02	0.386	0.005	0.0772
Sodium color. sterilz'd	0.2	3.09	0.2	3.09	0.2	3.09
Distilled water *ad*	100.0	3.2*	100.0	3.2*	100.0	3.2*

* Ounces.

Ocular Injuries.

By Don M. Campbell, M. D.

Injury in the eye, as elsewhere, varies from the simplest lesion requiring the simplest remedies to the most severe, involving the whole orbit, and introducing the burning question of the retention or sacrifice of an eye, and its consideration often reveals to us the parting of the roads—the one path leading to complete and absolute blindness, the other to the retention of at least one useful eye to a grateful patient.

The simplest injury an eye can receive is perhaps the retention of a small foreign body in the conjunctival sac, and requires merely the removal of the offending substance. There is, however, in this connection a point of practical interest to which I would like to especially call your attention in passing, viz.: In searching for a foreign body in the conjunctival sac do not be satisfied with everting the lids and examining the conjunctival surfaces thus exposed, but pursue your investigation into that part of the conjunctival sac known as the fornix conjunctivae, or retrotarsal fold, because occasionally a foreign body may be lodged there and perhaps escape attention unless search be made in this locality.

The January, 1898, number of the Ophthalmic Record contains a report of a case bearing on this subject in which a patient carried a large piece of wood in the retrotarsal fold for nine months.

Superficial wounds and injuries involving the conjunctiva, cornea, or sclerotic, but not producing perforation of the globe or other intra-ocular injury, require treatment along the lines of antiseptic surgery as applied to wounds in general.

Burns, in addition to the management of the injury itself and its direct results, require especial attention in order to obviate adhesions between the lids and the eyeball.

Perforating wounds of the eyeball demand our most painstaking and careful attention in order to properly conduct the case to a successful termination.

In any case of perforating wound of the eye-

ball which may come before you for investigation, the thing of primary importance to determine is whether or not a foreign body is retained within the eyeball, because upon the early and exact settling of that question a very great deal depends as to the therapeutic management of the case.

The history of the injury, the form and size of the missile, together with a close and scrutinizing examination by means of good light, oblique illumination and the ophthalmoscope will frequently make us sure of our ground.

In doubtful cases, where the missile is of iron or steel, the employment of the magnet, either Haab's large magnet or any of the various smaller ones generally in use, will frequently determine the question. In this connection the X-ray might also be mentioned, as it has frequently been used successfully in deciding whether or not a foreign body is retained within the globe.

Upon the one hand, if no foreign body be retained within the eye it is important to determine the exact relation of the wound to the ciliary body and also the probable condition of the eye as to appearance and utility when cicatrization has taken place. If the wound be in the ciliary region and of such gravity as to leave no hope of retaining a sightly eye, or one in which a reasonable certainty of retaining useful vision can be entertained, surgical interference should be instituted. It is not, however, necessary to immediately remove these injured eyes; a week or ten days may safely be allowed to elapse, the wounded member and its fellow being kept under close observation and the first signs of sympathetic inflammation early detected.

If a foreign body has been retained within the eye its removal becomes imperatively necessary. No compromise should be permitted with that rule. The foreign body must be removed at once, otherwise sympathetic inflammation will surely follow sooner or later and the vision be destroyed in both eyes. If, however, the removal of the foreign body be found impossible, then surgical interference is demanded and justifiable.

The treatment of an injured eye apart from surgical interference consists, briefly, of: (1) Thorough antisepsis; (2) continuous application of cold in the early stages, followed by hot applications later on; (3) atropine, excepting where glaucoma intervenes as a complication. Should secondary glaucoma manifest itself, the atropine would have to be discontinued and pilocarpine or eserine employed in its stead, or operative interference may be demanded to meet the increased tension.

The surgery of an injured eye is a many-sided question and involves some of the most perplexing situations presented to ophthalmologists. The complication glaucoma may demand a corneal paracentesis, a sclerotomy, or an iridectomy.

The surgery of an eye containing a foreign body leads us into any procedure necessary for its removal—simple incision, sclerotomy, iridectomy, cataract extraction, and the various manipulations with the magnet. Some results are permanently brilliant; others are primarily brilliant and subsequently not so, because cicatrization will frequently ultimately destroy what at first seemed a very good result; yet others are a failure from the beginning.

After having done all possible from every standpoint to retain the eye and save all possible vision to the patient, you will find a class of cases in which the injury is so great as to preclude the saving of the eye, and which manifestly demands surgical interference in order to save the fellow eye from the ravages of sympathetic inflammation, or to secure to your patient the very best cosmetic result. In order to meet the indications in this class of cases many operations have been proposed, the groundwork of them all being unquestionably enucleation or removal of the eyeball entire; but in its practical application enucleation has been found in many cases to be followed by certain unpleasant conditions. The artificial eye is frequently fixed and staring; deep depressions occur between the brows and the artificial eye which render the cosmetic result not all that one would wish for; and furthermore, the wearing of a concave shell in a concave orbital cavity produces an irritation which is accompanied by a muco-purulent discharge necessitating frequent laundering of the eye and cavity.

To avoid these unpleasant effects many operations have been tried as substitutes for enucleation, viz., evisceration, optico-ciliary neurotomy, trans-plantation of the rabbit's eye; but not until the English ophthalmic surgeon, Mules, invented the operation which now universally bears his name was any real advance made. About twelve years ago Mules published the details of his operation, and since that time it has been steadily growing in favor until now many ophthalmologists do the operation in suitable cases, thus securing to their patients a very much better result than that obtained from the ordinary enucleation. This is true chiefly because the Mules operation gives a large movable convex stump on which the concave shell of the artificial eye is permitted to rest, the sulcus below the orbital margin of the frontal bone is well filled out, the artificial eye is quite movable, and there is no muco-purulent discharge from the conjunctival sac. Some have raised the objection that sympathetic inflammation is liable to follow, but as yet no such result has made itself manifest.

The operation, which is not difficult to per-

form, is done in the following manner: After the induction of general anæsthesia and the sterilization of the field of operation, the ophthalmostat is introduced, the conjunctiva dissected back as far as the equator of the ball, and the four recti muscles severed close to their scleral attachment; the cornea is then transfixed with a Beer's knife as in the flap operation for cataract, by which procedure the cornea is detached from the sclera in its upper half; then with forceps and scissors the entire cornea is carefully removed.

The contents of the eyeball are now entirely removed, care being taken to thoroughly evacuate all remains of the ciliary body and the head of the optic nerve. The scleral cavity is now thoroughly cleansed and disinfected, all bleeding points being controlled by tampons of bichloride gauze soaked in hot water. Having thoroughly cleansed the scleral cavity, the artificial vitreous composed of a glass ball of proper size is introduced and the sclera closed by a row of closely placed silk sutures running vertically. The conjunctiva is closed by a separate row of sutures placed horizontally. The conjunctival sutures are removed after five or six days and the scleral ones are allowed to absorb. The recovery is prompt and usually uneventful, but there may be considerable swelling from œdematous infiltration of the orbital tissue.

The after-treatment consists of rest in bed, a firm compress bandage over both eyes, and in addition, over the operated eye a pad kept constantly saturated in the following liquid as recommended by Fox of Philadelphia:

Tinct. belladonnæ.... .....2 drachms.
Tinct. opii..... .....2 drachms.
Tinct. arnicæ.... .....2 drachms.
Aquæ plumbi..... .....4 drachms.
Aquae camph..... .....1 ounce.
Aquæ destill.... .....q. s. ad 4 ounces.

The reaction for a few days is sometimes considerable, but the recovery is prompt.

I have to present to you for examination and serious consideration three interesting cases of ocular injury, each one of which will illustrate several of the points to which I have just referred:

Case 1.—J. H——, aged thirty-four, a strong and robust individual, never having been sick, presenting an unexceptional family history. Last July, while working at his trade of lumberman in the woods of northern Michigan, a chip of steel flew off the wedge he was using, perforated the cornea, and was retained within the eyeball. He received for some months expectant treatment only, so that when he came to the Detroit Sanitarium five months after the injury Dr. C. G. Anderson was able to detect the foreign body still within the globe. Upon careful examination the foreign body could be seen imbedded in the cataractous lens and the adherent iris. Here, then, was a case which imperatively demanded operative measures for the removal of the foreign body. An operation was performed by which, as you can easily see, an iridectomy was done, the lens extracted, and the foreign body removed, it proving to be a wedge-shaped piece of steel two millimeters long by one millimeter wide.

An examination of the eye in its present condition shows it to be perfectly quiet, all irritation having subsided, with a clear pupil, good vision, and a faint scar in the cornea showing where the foreign body passed through.

Case 2.—John F——, aged eight years, was struck in the right eye four years ago by a large piece of iron, producing an extensive wound of the cornea, the healing of which resulted in a leucoma adherens. The eye is absolutely blind, very painful and tender; the tension is markedly increased; secondary glaucoma. The left eye of late has been quite distinctly irritated.

This is a typical case for a Mules' operation, which I will now proceed to perform, and you will be able to follow each step of the operation as I described it to you a few moments ago.

Case 3.—J. M——, aged thirty-five, a metal worker by trade; personal and family history negative. The right eye was injured five days ago by a piece of wire cutting deeply into the cornea, and as you see the wound extends well into the sclerotic. There is a traumatic cataract, the iris is detached from its ciliary attachment for one-third of its circumference, and iritis has supervened.

This eye is mortally wounded and will have to be dealt with surgically, and by far the best thing to do would be a Mules' operation. In the meantime it will be treated by continual applications of cold, antisepsis, and atropine, a close watch being always kept for sympathetic inflammation, as it is wounded in the most likely locality to produce disturbances in the fellow eye.—The Medical Age.

Eucaine "B."

By Professor Reclus.

At about this time last year I communicated to this body in my own name and in that of our colleague, Professor Pouchet, the results of our experiments with eucaine.

In February, 1897, Dr. Silex of Berlin brought forward a new substance which he designated eucaine "B," to distinguish it from the first product, which was henceforth to be known as eucaine "A." This new anaesthetic is a chlorhydrate of benzoylvinyldiacetonalkamin, and has been studied in France by Pro-

fessor Schmidt of Nancy, by Dr. Dolbeau, and by his chief, Dr. Panas. The latter will perhaps tell us concerning the value of this substance in ophthalmology. I myself have been experimenting with eucaine "B" in conjunction with my pupil, Dr. Legrand, for the last six months; and it is the result of our joint labors that I desire to briefly communicate to you to-day.

Eucaine "B" possesses a certain number of indubitable advantages. In the first place its solution can be boiled without undergoing decomposition, thus permitting it to be sterilized by heat. This cannot be done with cocaine; for, as is well known, at a temperature of 80° C. (176° F.) it is transformed into ecgonine, a substance devoid of all analgesic power. In the second place, solutions of eucaine "B" are stable; and this is the case to such an extent that we have been able, in conjunction with Dr. Legrand, to perform a number of long and delicate operations with solutions that were more than four months old. This is far from being possible with cocaine solutions. They change at the end of four or five days, and they can no longer be used by about the fifteenth day. Finally, and this is really the most important point, eucaine "B" is much less toxic than is cocaine. All experimenters have come to this conclusion. Like Silex and Schmidt, Legrand and Joanin have demonstrated that 8 centigrams (1 1-5 grains) of cocaine per kilogram (2 1-5 lbs.) of weight will kill a guinea-pig, whilst it takes 30 centigrams (4⅝ grains) per kilogram (2 1-5 lbs.) of eucaine "B" to have the same effect. The toxicity of eucaine "B" as compared with that of cocaine is therefore as 1 to 3.75.

Such an advantage is not to be overlooked, and the security which it gives us can readily be seen. Our previous experiments have demonstrated to us that it was not prudent to exceed or even attain a dose of 20 centigrams (3 grains) of a 1 per cent solution of cocaine; larger doses being liable to cause serious accidents. Eucaine "B" can be used much more freely. The experiments made with guinea-pigs seem to show that enormous doses of 50 to 60 centigrams (7 7-10 to 9 1-4 grains) may be administered with impunity to the human subject. Practically we have never employed these colossal doses; nor do we know any operations within the domain of local anaesthesia in which such enormous quantities of the anaesthetic would be necessary. We have never used more than half of this quantity, 20 to 25 centigrams (3 to 3⅞ grains) in our operations for the radical cure of hydrocele, and hernia, for our artificial anus operations, our gastrostomies, our anal dilatations, our haemorrhoid operations, and our resections of the scrotum. But, if the cases had required it, we should not have hesitated to give much larger doses.

To administer such doses of 25 and 30 centigrams (3 to 3⅞ grains) of eucaine "B" we have changed the method which we have so long followed in the employment of cocaine. All our cocaine solutions have been of the strength of 1 per cent. But, as eucaine "B" appeared to have a little less analgesic effect than cocaine, and since its toxicity is very much less, we have found it better to employ a 2 per cent solution. This is active enough to permit us to incise the tissues immediately after the injection of the last syringeful of the solution. With 1 per cent solutions we found it necessary to wait for five minutes until the analgesia was completely established. The 2 per cent solution appeared to be quite sufficient for all purposes; and we believe it to be both useless and dangerous to employ 5 per cent to 10 per cent solutions recommended by Schering and Lohmann. Though eucaine is much less toxic than cocaine, it is still poisonous; and with such exaggerated doses I fear the occurrences of such catastrophes as have unfortunately marked the advent of cocaine. Indeed, it is quite possible that the 10 per cent solutions that are spoken of are imaginary ones; Silex, and later Legrand and Joanin have fixed the coefficient of solubility of eucaine "B" in water at 15° C. (59° F.) at 5 per cent. How then could Lohmann and Schering prepare their 10 per cent solutions?*

As is seen, we recognize some very marked advantages in eucaine "B;" but there is one more which we have not yet mentioned. Dentists cannot put their patients to bed; they must, perforce, let them get up and go after the local anaesthesia. This practice is not free from danger after cocainization; with the assumption of the erect posture there sometimes appear vertigo, a tendency to syncope, gastric pain, and vomiting. We saw such a case only a few days ago. These accidents may be avoided by maintaining the recumbent posture for an hour or two after the operation. But this, which should never be omitted after a cocainization, is difficult for the dentists to enforce. If it is true, though we have not yet a sufficiently large number of observations to affirm it positively, that with eucaine "B" the patient can get up and walk immediately after the operation without any risk, it is evident that this fact alone should cause it to be used instead of cocaine in all dental operations.

Are we, then, now in a position to generalize and proscribe cocaine for the benefit of

*Ten per cent solutions can be prepared by simply warming the water, but it should be noted that after cooling a part of the Eucaine "B" will separate. These crystals can be dissolved again by warming the solution without in the slightest degree affecting the action of the solution. Such concentrated solutions remain perfectly clear quite long enough for the completion of an operation. (Translator's note.)

eucaine "B" in surgery? I cannot decide to do it, and for the following reasons: In the first place the analgesic power of cocaine is really a little greater than is that of eucaine "B." Then again eucaine "B," like eucaine "A," is a vaso-dilator, and the hyperaemia of the tissues causes hemorrhages that obscure the field of operation. Finally, 20 to 30 minutes after the operation there sometimes appears in the eucanized wound a very disagreeable smarting, lasting for one or two hours. A number of patients complain of this. These disadvantages, though of no great importance, as I admit, lead me still to prefer cocaine, which, with the technique that I have employed for the last ten or eleven years, has been used in more than 4,000 operations without a single serious accident. This technique, by the way, has lately obtained important adherents in the Germans Braun and Hackenbruch, who maintain that it is the best that can be employed.

I will end and sum up this communication with the two following propositions: 1. Cocaine, well and prudently administered, seems to us to remain the best anaesthetic; 2. Eucaine "B" stands very little behind it, and is to be preferred in dentistry and in such other cases where the field of operation is extensive, and require the employment of a large quantity of the anaesthetic substance. Under these latter circumstances especially, eucaine "B," less toxic, has important advantages.—Bulletin Medical, March 30, 1898.

Survival After Receiving Two Thousand Volts, or Thirty Amperes, Electrical Current.

By J. J. Brownson, M. D., Dubuque, Iowa.

The introduction of electricity as a means of transmitting high power having come into uses so rapidly in recent years, and brought with it the most deadly force known to science, has given us a class of accidents occurring from high currents, with a series of injuries comparatively new, the discussion of which cannot fail to be of more than ordinary interest to our profession. The case I wish to present illustrates the effects of receiving a current of high voltage, in fact it is the highest known voltage with recovery. The accident happened on the 4th day of June, 1895.

John Krall, aged thirty years, a wireman in the employ of the Star Electric Light Company, of this city, was ascending a pole to adjust the wires connected with the transformer. He proceeded to cut the "live" electric light wire, using an insulated wire cutter held in the right hand. He first cut the secondary wires, then the main or primary wire. As he reached up and severed the remaining primary wire his right thigh came in contact with the secondary wire, that happened to be crossed with a telephone wire, which was grounded in the block below. He thus completed the circuit through the pliers, and allowed the full current of high voltage (in fact it is the highest known voltage) to pass through his body, became unconscious and fell across the wires suspended from the cross beam.

His assistant telephoned to the engineer at the power house, who threw the switch and stopped the current. The injured man lay upon the wires for about seven minutes, until removed by members of the fire department. When taken down he was found to be unconscious, and was promptly removed to the office of the nearest physician, where, under the influence of restoratives, he gradually revived. After his injuries were dressed he was removed to the Mercy Hospital, this city, where I saw him about two hours after the accident.

The patient was very much exhausted and suffered from great shock; his pulse was rapid and weak, his right hand and arm were very badly injured, exhibiting a burn of the third degree. The integument on the anterior portion of the hand and fingers which held the pliers was completely charred, exposing the tendons. The thumb of the left hand was completely carbonized and the index finger badly hurt. There was a large burned area below the left nipple, which was undoubtedly caused by the transmission of the current through a lead pencil in a pocket of his vest, and immediately over his left breast. There was also a large burn about seven inches long by three and one-half inches wide on the anterior portion of the right thigh. These injuries were very painful, and required continuous injections of morphine. The right arm was placed (at intervals) in a carbolized bath and every attention to antiseptic details fully observed.

As the case progressed he seemed to develop considerable nervous phenomena. The pulse and temperature increased and he became delirious at times. He continued in this condition until the second week, when it was plainly seen that gangrene of the right arm to the upper third of the arm had set in, and was fast approaching the body. Upon consultation it was decided necessary to remove the arm close to the shoulder, as the only hope of saving his life. Accordingly on the 19th day of June the patient was removed to the operating room and the amputation performed. The operation, which required about fourteen minutes, left him in a collapsed state. He was given hypodermics of strychnine, and external heat applied. He slowly reacted, and by the morning of the 20th was feeling much better; pulse 90, temperature normal.

The case continued to do well until the 2d of July, when the dressings were changed for the first time; the amputation wound was found well united, fresh gauze was applied and bandages readjusted. In the other wounds the eschars were separating, leaving ulcerated surfaces, which were healing by granulation. This mode of treatment was continued from time to time until October 1st, when he was permitted to leave his room. At this date the wounds were all healed, except a small portion of the one in the thigh and the one in the thumb.

About November 1st the patient began to increase rapidly in weight, and complained of severe neuralgic pains, especially in the right side and in the thumb. As the granulations of the thumb failed to cicatrize and caused him great annoyance, the offending member was amputated. Nothing unusual from this time on presented itself. The pain and nervous phenomena gradually passed away, and with it a surplus of flesh, so that I am now able to introduce to you Mr. John Krall, the only man in the world who received a current of electricity of 2,000 volts (of 30 amperes) and lived to narrate the facts.

The literature of this subject is, as yet, meagre, and statistics give little data upon which to base conclusions. It seems to be understood, however, that 600 volts is deemed by scientists sufficient to produce instant death, and that the extreme voltage of the death chair is 2,000. The case of Mr. Wm. McNamara, a lineman of Albany, N. Y., who received a shock of 1,000 volts while repairing a circuit in the city of Troy, this fearful current passing through him for a period of twelve minutes, is the nearest parallel with which I am acquainted. Mr. McNamara, like Mr. Krall, describes the symptoms of numbness, sickness of the stomach, buzzing of the ears and an apprehension of being shocked again. In a case mentioned in the New York Medical Record, March, 1898, in which the X ray was used in making a diagnosis of a disease of the knee, this procedure being followed by gangrene and subsequent amputation of the thigh, it was the opinion of several surgeons that the X ray had some peculiar effect on the tissues and caused death of the parts from within. Might not this element of that little-understood fluid have something to do with the production of gangrene in the arm of my patient? Be that as it may, we are now to have as frequent occurrence a class of accidents from these high powers of electricity; they are to be accompanied with unconsciousness, sickness at the stomach, buzzing in the ears, and the apprehension of being shocked again, followed by a peculiar neuræsthenia of a more or less lengthy duration; these symptoms to be associated with terrific burns, with tissues charred and carbonized; terminating in gangrene, sloughing wounds, deformities and oftentimes death.

How best to conduct such cases will require our best efforts and soundest judgment. To accomplish this need I say that I believe the treatment outlined is on general principles to be relied upon, conservative while there is hope, but radical when necessity demands.—Amer. Jour. Surg. and Gynecol.

Three Cases of Fractured Patella Treated by Wiring; Excellent Results in Each Case.

By J. V. Meigs, M. D.

In the Boston Medical and Surgical Journal of the issue of December 16, 1897, there appeared an interesting editorial on the "Treatment of Fracture of the Patella." Strange to say, the notes of three cases have been lying upon my desk, cases occurring during my service at St. John's Hospital in the year 1896, which I was intending to report at some future day. These cases have been to me interesting. I was first led to treat these fractures by wiring from observation of a case seen in consultation.

A man, although strongly advised by his attending surgeon and myself to submit to operation, refused, necessitating its dressing in the old way—elevation, straps and figure-of-eight bandage. This case was a very difficult one to hold; in fact, it was out of the question, on account of swelling and pain, to even approximate coaptation of the fragments. The dressings had to be changed, frequently tightened, then loosened, and then tightened again. The result in this case (and I very carefully watched it) was not good, yet it was as good, if not better, than many others which I have seen treated in the same manner. In this case the union, fibrous or otherwise, which he got was slow, the patient being confined to his bed for six or seven weeks. His position in bed uncomfortable, sufferings excruciating, both from his position and the form of dressing used. After getting up from his bed it was five and one-half months before he was able to attend to his work. Then there is a separation of nearly one inch between the fragments, and while not lame, yet he has a limb that he cannot use as he did before. This case I watched carefully, and made up my mind, from its progress and from its result, that the next case I had with this fracture I would strongly advise wiring. I have wired three, as will be seen below, with excellent results. All three of my cases were young adults in good health and of good habits.

Case I.—J. M., aged twenty-three years, and a laborer by occupation, fell some little distance April 10, 1896, striking upon the right knee. He was carried to St. John's Hospital,

carefully examined, and found to be suffering from a transverse fracture of the right patella. The knee was enormously swollen and exquisitely sensitive. His leg was elevated and icebags placed upon the knee as preliminary treatment until April 17, 1896. On this day, the swelling having considerably abated, he was placed upon the operating table, ether administered, and under the most strict asepsis a transverse incision was made over the patella, which was found to be fractured transversely into two fragments, the upper being quite a great deal the larger of the two. The joint was full of clotted blood, which was removed, the joint carefully washed out with sterile water and the edges of the fragments freshened by the use of a chisel; two holes were then drilled obliquely in each fragment,* care being taken not to go through the cartilage; silver wire, one-sixteenth of an inch in thickness, was then introduced, joint again carefully flushed, fragments brought together and wire twisted with several twists and hammered flat. Capsular ligament of the knee was then carefully united over the patella by a continuous suture (Leaven's No. 1 chromicized catgut being used). Skin then united by a running silk suture, sterile dressing applied, and leg placed upon a long posterior splint and elevated a little. This patient made an uneventful recovery. At the end of two weeks the stitches were removed, the wound having healed by first intention, and the leg again dressed as before. At the end of the next two weeks, or four weeks after the operation, the splint was removed and the result found to be perfect. A plaster-of-Paris bandage was now placed about the knee, and patient given crutches. After two more weeks, or six weeks after operation, patient was discharged well. He could bend the knee with ease and perfectly, and could kneel without much pain and with little inconvenience, and could walk without a limp.

Case II.—C. G., age nineteen, health and habits good, and a farmer by occupation, was admitted to St. John's Hospital May 12, 1896, suffering from a fractured patella. Upon inquiry the following history was elicited: March 14, 1896, while engaged in his work, he fell, striking on his right knee-cap. He was unable to get up, and was carried by the ambulance to St. John's Hospital. He came under the care of Dr. J. Arthur Gage, who made a diagnosis of transverse fracture of the patella, and advised wiring. This was done on March 15, 1896, by Dr. Gage, with a happy and perfect result. He was discharged April 27, 1896. After his discharge he immediately went to his work, and all went on well until May 12, 1896, when in jumping from a wagon to the ground he again fractured the same patella. He immediately returned to the hospital, where on May 13, 1896, I opened up his knee-joint by a vertical incision on the line of the scar of the previous operation. On getting down to the patella I found the bone broken transversely in two fragments, the wires broken next to the knots, the fragments wide apart, and the space between them and the whole knee-joint filled with blood clot. I removed the broken wire, cleaned out the joint and examined the fragments carefully.

There is no doubt whatever but that bony union, although somewhat feeble, had taken place, and that his fall had torn the fragments rudely apart. I freshened the edges of the fragments, made new drill holes, rewired and closed as in the above case. The dressing applied was the same as in Case I. This patient made an uninterrupted recovery and was discharged July 3, 1896, with a perfect union and with a limb almost as useful as it was before his first fracture.

Case III.—J. S., a laborer, aged thirty-one, admitted to St. John's Hospital August 17, 1896. On admission we got the following history: He had suffered a fall, striking his right knee against a curbing. His knee was greatly swollen, discolored and exceedingly painful. At the time of his admission I did not think it wise to operate at once; so he was put to bed, leg elevated and icebags applied to the knee. September 1, 1896, I operated, making a transverse incision, and carrying out the details as in the two previous cases. Patient made a perfect recovery and was discharged from the hospital October 17, 1896, without deformity, without lameness and in excellent condition.

Under strict aseptic precautions, given a young, healthy patient of good habits, I do not think I should hesitate a moment in deciding to operate. With operation the results are better, convalescence speedier, patient more comfortable, and the surgeon is saved from much condemnation.—Boston Med. and Surg. Journal.

* In drilling the holes I have made use of an ordinary metal-handled awl, such as can be purchased of any hardware dealer at a cost of 25 cents. The drills made for surgical use are extremely difficult of management, unwieldly, liable to break and cause annoyance.

Foreign Body in Anterior Chamber of the Eye.

By H. L. Alkire, M. D., Topeka, Kan.

Knowing by experience that not infrequently foreign bodies enter the eyeball; that the general practitioner is often the one first called upon for treatment and advice; that his skill and judgment is of paramount importance to the patient; further, that it is not always possible to have the assistance of an oculist from the beginning, I thought it would be well to refresh our memories by a

brief discussion along this line of duty. I consequently selected from our record book the case which seemed to me best intended to bring out some practical points in the management of these cases.

Mr. B., aged 49, farmer. December 19, 1897, was struck in the eye by a limb of an apple tree. Noticed a flow of water from the eye and loss of vision (except for light). All visible foreign bodies were removed; the eye bathed, and a horse liniment applied.

Half an hour later: Pain in the eyeball and temple; accompanied by nausea and vomiting. Symptoms remained about the same to December 24, when failing strength, increasing pain and inflammation caused patient to remain in bed, and send for his family doctor. About this time he began having daily chills, followed by fever and sweats.

We saw the patient December 30; condition as follows: Pulse 51; Sub. ling. temperature 100; tongue coated; anorexia and constipation; skin cold and clammy.

The eye: Œdematous inflammation of lids; acute purulent conjunctivitis, scleritis; a penetrating wound in sup. ext. quadrant of cornea; diffused keratitis. Anterior chamber filled with blood, and containing a splinter; motion of globe limited; light reflex doubtful.

The patient was taken to the hospital. After the usual antiseptic and aseptic preparation the eye was thoroughly cocainized; ante. chamber freely irrigated with corrosive subl. soln., boracic acid soln. and sterilized water, in the order named.

Examination under focal illumination revealed a plastic iritis and traumatic cataract. Dressed with sublimate gauze and bandage; every three hours atropine instillations; hot boracic acid soln. applied on cloths for fifteen to twenty minutes; salines q. s. to move bowels freely; recumbent posture.

January 1.—Rested well during night; very little pain; pulse 64; temperature normal; appetite good; bowels free. Treatment continued; recovery uneventful.

January 7.—Left the hospital; health perfect; eye clearing up nicely; pupil dilated; vision enough to discern persons and objects. Was instructed to continue the hot boracic soln. three times daily, and protect eye with smoked glasses. Reports have all been favorable; vision in right eye normal.—Kansas Medical Journal.

Never allow rubber plaster to come in contact with a surface uncovered by normal skin. Since it cannot be sterilized by heat, it must be considered as being dirty.—Lilienthal.

Annual meeting, Toronto, Canada, July 6, 7, 8, 1898.

Miscellany.

TRANSPORTATION TO TORONTO.

Members expecting to attend the annual convention at Toronto should make application for transportation in the usual way to the proper officer of their respective companies, asking such officer to request the necessary transportation over connecting lines.

Both the Grand Trunk and Canadian Pacific railways are prepared to show visiting surgeons all possible courtesy. The Grand Trunk Railway (Mr. C. M. Hays, general manager) will place a special train at the disposal of members going through Chicago and Detroit. Members are requested to show their appreciation of this courtesy by complying with the following recommendations:

1. All members who expect to go via Chicago, Detroit or intermediate points, over the Grand Trunk, are requested to make a point of using this special.

2. In order that the company may know as soon as possible how many passengers there will be on the special, members should communicate at once with Dr. Hutchison, chief surgeon Grand Trunk railway, Montreal, informing him of their desire to go on that train, and stating that application for transportation has been made through the proper channel.

Members should understand that these are matters of courtesy to the Grand Trunk railway, which is showing them great favor. The company naturally desires that, as it proposes to run the special train, all the travel should be concentrated thereon, so as not to crowd or embarrass the regular trains. It also wishes to know in advance for how many accommodations are to be provided for. Members will therefore co-operate by acting in accordance with the foregoing.

Similar conditions apply in the case of the Canadian Pacific. Members going from the St. Paul and Minneapolis territory and points west of there will be taken over the Soo line (Minneapolis, St. Paul & Sault Ste. Marie railway) and Canadian Pacific direct from Minneapolis to Toronto without going through Chicago. These roads will furnish special cars or other accommodations, if necessary.

Members will please see that applications for transportation are made through the proper channel to Mr. F. D. Underwood, general manager of the Soo line at Minneapolis.

Both the Canadian Pacific and Grand Trunk railways will also issue transportation for use on their regular trains for members who will connect with their lines at other points than those mentioned, an application being made through the proper officer.

For transportation to point of connection with the Canadian lines, the following circular letter to managers was sent out on May 23:

St. Louis, Mo., May 23, 1898.

Dear Sir:—The annual convention of the International Association of Railway Surgeons will be held at Toronto on July 6th, 7th and 8th, 1898. For a number of years past the various railway companies have granted transportation to members of the association who are properly accredited surgeons of railway companies on application of the proper officers of the companies employing them. This year the Grand Trunk railway will run a special train from Chicago to Toronto to take the members to the convention, and the "Soo" line in connection with the Canadian Pacific, has tendered the necessary accommodation and courtesies from Minneapolis and St. Paul to Toronto.

This is to ask you whether you will grant transportation as may be needed over your lines where they are necessary to points of connection with the Canadian roads on the following understanding:

1. None but properly accredited surgeons of railway companies who are members of the association in good standing are entitled to any transportation.

2. Applications for transportation will be made through the proper officer of the road employing the surgeon.

3. You are not expected or requested to grant transportation to the wives or members of the families of delegates, but only to the surgeons themselves.

Kindly also let me know if you will, as in former years, make the necessary application to connecting lines for your own surgeons, and oblige, Yours very sincerely,

W. B. OUTTEN.

Responses to this are now being received as we go to press. Those already received are published below. Many companies which have not yet replied will doubtless do so, and members are not to suppose that because a company's name does not appear among the following it is not prepared to extend the usual courtesies. There is every reason to suppose that practically all companies will do so. Members should request the proper officer of their company to make all necessary applications as soon as possible.

The substance of the replies received is given below:

ANN ARBOR RAILROAD.

We will grant transportation and request it for the surgeons of this company under the conditions stipulated in your memorandum.—H. W. Ashley General Manager.

CHATTANOOGA, ROME & SOUTHERN RAILROAD.

I beg to advise that we are willing to furnish the transportation under conditions outlined in your letter.—C. B. Wilburn, President.

CHICAGO & ALTON RAILROAD.

Your communication of 23d inst., addressed to our vice-president, has by him been referred to this office, with request to inform you that on written or personal application at our vice-president's office in Chicago; at the office of Mr. D. Bowes, General Western Passenger Agent, 216 North Broadway, St. Louis; Mr. A. Hilton, General Agent Passenger Department, Grand Junction Ticket Office, Ninth, Main and Delaware streets, Kansas City, Mo.; A. G. Robinson, General Agent Passenger Department, 327 Main street, Peoria, Ill., free transportation will be issued to your delegates in going to and returning from the above meeting at Toronto, Canada, provided such delegates are properly accredited surgeons of railway companies, and hold an application for such transportation from the proper officers of the railway companies with which they are employed. It is also understood, in accordance with your letter of May 23, that we are not expected and will not be requested to grant free transportation to the wives or members of the families of delegates, but only to the surgeons themselves.—James Charlton, General Passenger Agent.

CHICAGO & EASTERN ILLINOIS RAILROAD.

This company will honor requests for transportation for railway surgeons when such request is made by the proper official of the road desiring such transportation, as may be needed, as far as our line in concerned, to the International Association of Railway Surgeons, to be held at Toronto, July 6 to 8.—M. J. Carpenter, President.

CHICAGO GREAT WESTERN RAILWAY.

We will, as heretofore, grant transportation to surgeons on request of general manager of road employing them. We will also make necessary requests on connecting lines for our own surgeons.—C. P. Stembel, Assistant to General Manager.

CHICAGO, INDIANAPOLIS & LOUISVILLE RAILWAY.

This company will be glad to respond to re-

quests from proper officers of railroad companies for transportation for their surgeons who go as delegates to the annual convention, to be held at Toronto, commencing July 6. We will also apply to connecting lines for passes for our surgeons who go as delegates to said convention.—W. H. McDoel, Vice-President and General Manager.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

This company will pass free over its lines delegates to the annual convention of the International Association of Railway Surgeons upon request of the proper officer of the railway company by which they are employed. We will request transportation over other railroads for such of our surgeons as we think are entitled to the same.—W. G. Collins, General Manager.

CINCINNATI, HAMILTON & DAYTON RAILWAY.

I will be pleased to issue transportation to the surgeons en route to the annual convention at Toronto in July upon receipt of request from the proper officer of the road by which they are employed. We will also request transportation from connecting lines for our own surgeons who wish to attend the convention.—C. G. Waldo, General Manager.

CLEVELAND, CANTON & SOUTHERN RAILROAD.

It has been and still is my practice to grant transportation to railroad surgeons upon application of the proper officer of the railroad employing them. I make application for transportation for our own surgeons.—J. W. Wardwell, Receiver and Manager.

EVANSVILLE & TERRE HAUTE RAILROAD.

This company will be pleased to grant transportation to such members of the International Association of Railway Surgeons, together with their wives and children, as may desire to attend the convention at Toronto, provided that the application for transportation is made by one of the chief operating officers of the road by which they are employed. —H. C. Barlow, President.

ILLINOIS CENTRAL RAILROAD.

I beg to advise that the practice of this company in the past has been to issue passes to its own surgeons going to these conventions and to surgeons of other lines upon receipt of request from the proper officer. We shall probably do the same this year.—J. T. Harahan, Second Vice-President.

IOWA CENTRAL RAILWAY.

Replying to your circular letter of the 23d inst., asking whether this company will grant transportation as may be needed over its lines for the occasion of the International Association of Railway Surgeons, to be held at Toronto, July 6, 7 and 8, 1898: This company will be glad to do so and we will also make application to connecting lines for such of our own surgeons as may wish to attend.—L. M. Martin, General Manager.

JACKSONVILLE & ST. LOUIS.

The J. & St. L. Ry. will take pleasure in issuing free transportation over its lines to railway surgeons on application being made by proper officials of the roads employing them.—C. M. Stanton, General Manager.

KEOKUK & WESTERN RAILROAD AND DES MOINES & KANSAS CITY RAILWAY.

We will furnish transportation for properly accredited surgeons of any railway company to attend the convention at Toronto, July 6, 7 and 8, when application is made by proper officer of the road employing the surgeon. I will apply to connecting lines for any transportation which I may deem proper for our surgeons to have.—A. C. Goodrich, Vice-President and General Manager.

LOUISVILLE, EVANSVILLE & ST. LOUIS CONSOLIDATED RAILROAD.

This line will ask transportation for such of its surgeons as it may be practicable to have attend the convention, and we will grant transportation to surgeons of other lines whose operative officers will make request for them in the regular way.—Geo. T. Jarvis, Receiver and General Manager.

PENNSYLVANIA RAILROAD.

This company will adhere to its previous practice, viz.: To issue passes to its own surgeons attending this convention, only over its own road and will issue passed to only such surgeons of foreign lines as devote their entire time to railroad service, and who can therefore be considered as coming under the same rules as other railroad employes.—J. B. Hutchinson, General Manager.

ST. LOUIS, PEORIA & NORTHERN RAILWAY.

I shall be very glad to honor requests for transportation to accredited surgeons of railway companies, who are members of the International Association of Railway Surgeons in good standing, entitled to transportation to attend the annual convention at Toronto, July 6, 7 and 8.—W. E. Guy, President and General Manager.

THE TEXAS & PACIFIC RAILWAY.

This company will take pleasure in issuing, or requesting, transportation, as outlined in your letter, furnishing its own surgeon with transportation over this line, and requesting the favor from connecting lines, also furnishing transportation to delegates who are employes of other lines, on receipt of usual request from the other lines.—L. S. Thorne, Vice-President and General Manager.

TERRE HAUTE & INDIANAPOLIS RAILROAD.

We will be glad to grant passes to surgeons of railroad companies over our line who desire

to attend the International Association of Railway Surgeons at Toronto, provided the requests are made by the proper officer of the different roads. It is also our intention to request transportation from our connections for some of our own surgeons who desire to attend the meeting.—J. J. Turner, General Manager.

TOLEDO, PEORIA & WESTERN RAILWAY.

This road will take pleasure in granting transportation to the surgeons of other roads on request of any general officer of such road. —E. N. Armstrong, General Superintendent.

TOLEDO & OHIO CENTRAL RAILWAY.

Our company will be pleased to grant transportation to surgeons and their wives wishing to attend the International Convention at Toronto, on July 6, 7 and 8, upon proper request from officials of roads upon which they are employed.—J. M. Ferris, General Manager.

UNION PACIFIC RAILROAD.

Your circular letter, 23d inst., to general manager of this company, relative to transportation for members of the International Association of railway surgeons to attend the annual meeting at Toronto, has been referred to me for recommendation. I take pleasure in advising you that I shall use my best efforts to have your request complied with in full.—A. F. Jonas, Chief Surgeon.

UNION PACIFIC RAILROAD.

We shall be glad to treat the surgeons as we have in former years and will issue transportation in accordance with your letter.—E. Dickinson, General Manager.

THE WABASH RAILROAD.

It will afford me pleasure to honor the requests of other lines for passes in favor of their company surgeons en route to the International Association of Railway Surgeons' Convention, which will be held at Toronto on July 6, 7 and 8. We shall also be pleased to make requests on connecting lines for transportation required for any of our own surgeons who may desire to attend.—J. Ramsey, Jr., Vice-President and General Manager.

WISCONSIN CENTRAL LINES.

We will issue transportation over our line for any surgeon who is a member of your association, upon request of the proper officer of the railway company with which he is connected, and will also make application for transportation on other roads for such of our local surgeons, members of your association, as may desire to attend the convention to be held at Toronto in July.—H. F. Whitcomb, General Manager.

In addition to the above similar responses have been received, as we are on the point of going to press, from the following roads:

Fitchburg Railroad.

Atchison, Topeka & Santa Fe (J. J. Frey, general manager).

Northern Pacific Railway (J. W. Kendrick, general manager).

Lehigh & Hudson River (Grinnell Burt, president).

Western New York & Pennsylvania (R. Bell, general superintendent).

Union Pacific, Denver & Gulf (T. F. Dunaway, general superintendent).

Toledo, St Louis & Kansas City (R. B. F. Peirce, receiver).

Florida Central & Peninsular (D. E. Maxwell, second vice-president and general manager).

Lake Erie & Western (D. S. Hill, general superintendent).

Lexington & Eastern (H. C. McDowell, president).

Buffalo, Rochester & Pittsburg (G. E. Merchant, assistant to president).

Atlanta & West Point and Western Railway of Alabama (Geo. C. Smith, president).

Colorado Midland (Geo. W. Ristine, president).

Denver & Rio Grande (E. T. Jeffery, president).

West Shore Railroad (John D. Layng, second vice-president and general manager).

West Virginia & Pittsburg (A. H. Kunst, vice-president and general manager).

Chicago, Peoria & St Louis (H. W. Guys, general manager).

Columbus, Hocking Valley & Toledo (N. Monsarrat, receiver).

Kansas City, Watkins & Gulf (Thos. Saunders, general manager).

Quebec Central of Canada (Frank Grundy, general manager).

B. & O. Surgeons' Association.

This association met at Wheeling, W. Va., on May 12 and 13. The committee appointed to select a time and place for the next annual meeting reported unanimously in favor of Baltimore as the place, and recommended that May or June be the time.

The election of officers for the ensuing year resulted as follows:

President—Dr. R. J. Reed of Wheeling.

Vice-President—Dr. S. Chandler of Wilmington, Del.

Second Vice-President—J. A. McKeane of Wilmington, Del.

Secretary-Treasurer—L. Hesler Ball of Foulkland, Del., reëlected.

Assistant Secretary—J. A. Batton of Uniontown, Pa.

Executive Committee—J. A. Geyer of Norwich, O., and G. W. Larrick of Middletown, Va.

THE Railway Surgeon

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MORE CAREFUL ATTENTION TO MINOR DETAILS IN SURGERY.*

BY J. W. STEALY, M. D., FREEPORT, ILL.

I refer more especially to railway accidents. How often have I seen the surgeon, when called to an emergency case, grab up his bag and rush to the scene. Upon arriving to immediately thrust his dirty fingers into the wound, as much to say to the laity, this is the sine qua non!

You will all agree with me when I say this is all wrong, and is often the fruitful source of much trouble. I do not remember of ever seeing a case that needed any such treatment; neither have I seen a case that demanded an amputation upon the spot, in the car or on the platform, as has too often been done. If, in case of severe hæmorrhage, use either a tourniquet, or tightly constrict the member with roller bandage, using, if necessary, a stick to twist it. Cover the wound with sterile gauze or cotton, and over this a bandage. Now you may have patient removed to more suitable place. Any other emergencies may be cared for in the meantime. These precautions will save many days in patient's recovery, or possibly his life. When you have patient comfortably quartered prepare yourself for the work:

1. By the free and unstinted use of soap and water, scrub hands, and see well to the finger-nails that they may be clean.

2. Having observed previously what is needed, you may now prepare your instruments and dressings, which have been sterilized.

The instruments may be sufficiently sterilized by dipping into pure carbolic acid for a moment. As is often the case, you have little room and few things to work with. Wring towels out of a five per cent solution of carbolic acid, and spread on chairs, or stand or table, upon which to place your instruments, dressings, ligatures, needles and suturing material. For the latter I prefer silkworm gut. If silk is used, it must first be boiled, and not used, as is so often the case, without sterilization. In this class of cases we often get lacerated or incised wounds, which do not involve more than skin or the superficial tissue beneath, and great care must be taken to get edges nicely approximated. Sutures must not be tied too tightly, or, regardless of preliminary precaution, we get necrosis and sloughing of tissue from strangulation, cutting off nutrition of tissue embraced by suture.

Now, when preliminaries are all in readiness, examine parts more carefully, considering, of course, an assistant or volunteer has the patient anæsthetized. If not, do it yourself. Then give the ether in charge of an assistant. Now, again, you must sterilize hands before attacking wound.

3. Scrub the wound and field about with soap and water, and, if necessary, do not be afraid to use the brush upon the open wound. Then flush with boiled water or a bichloride solution, or, as I much prefer, to mop well the whole field with a five per cent solution carbolic acid, and immediately flush with alcohol (which, by the way, neutralizes the caustic effect of the acid). Right here I will call your attention to the fact that you may dip your hands into pure carbolic acid, and if then followed immediately by an alcohol bath, you will neither see nor feel any of the corrosive effect of the acid. The parts about the wound should be well protected with wet towels, wrung out of a bichloride solution 1-1000. With this precaution you will avoid plunging your hands either in your pockets or instrument case for this or that instrument wanted.

4. Now, if patient, who may be but partially anæsthetized, struggles, do not take hold of

*Read before the fifth annual convention C. M & St. P. R. R. Surgical Association.

him, as under these conditions his clothing, etc., are necessarily very dirty; but if required to do so, be careful to cleanse your hands again before going into the wound. By a little negligence of the precautions, I have seen wound infection, followed by cellulitis or lymphangitis, etc., where otherwise the technique was almost faultless, and the surgeon became perfectly amazed at all this infection, after his careful preparatory preparations.

In these cases do not fail to provide for proper drainage, such as the surgeons may choose. I much prefer drainage tubes in such cases. I am usually in the habit of dusting the wound with some drying antiseptic powder, either boric acid, stearate of zinc with boric acid or aristol. The drying properties I believe to be the chief element of the powder. Then cover the wound with dry sterile gauze and cotton, using a roller bandage to retain the same in place.

Now, if I have not used drainage or the dressing does not become wet, excepting patient complains of great pain or fever, either of which are sufficient and points to trouble, let the wound go unopened for three to six days, when wound will be kindly healed and the stitches may be removed. I am very partial to silkworm gut, and use it exclusively. I take a bundle of silkworm gut and clip off both ends, which are useless, and bring cut ends together and push them into a glass tube (such as I here exhibit), leaving the middle, or bowed end, up, and as I use them, can easily pull out one or more strands with a forceps, as is required, leaving the others undisturbed. I now boil it for one hour; then pour upon it a saturated solution of methylene blue in alcohol, and let it stand twelve to twenty-four hours; then pour it off and boil again for one-half hour; then pour alcohol upon it and it is now ready for use.

I now have a blue suture material, which is easily seen. It is also much less porous than silk, and does not offer so fertile a culture for the staphylococcus.

You all know how difficult it is to thoroughly sterilize a contused or lacerated wound where the parts have been shoved along in the dirt, cinders, gravel, etc. I have closed such wounds after thorough use of soap and water, followed by mopping with five per cent solution of carbolic acid and flushing with alcohol, where considerable portion of the tissue were yet black, though not with cinders, but rather stained, as it were, from them, and wound healed kindly without any evidence of sepsis. But a short time ago I had a patient referred to me by a surgeon who had not made the faintest attempt to cleanse the parts, using neither soap nor water for hands or wound, but closed it with dirty silk, taken from his pocket-case, with the result, in two or three days, of extreme evidence of sepsis. I undid all that he had done, and tried as best I could to render wound as aseptic as possible, removing dirt, cinders, etc., followed with a wet dressing. I had a wonderful change of the parts for the better within twenty-four hours. I might refer you to many such instances as to the utter disregard many men who profess to do surgery have of these apparently minor details, which are so essential to the successful surgeon.

Gentlemen, I do not know that I have added to your knowledge one new point, but if I have succeeded in refreshing your memories in these little things, which go to make up the big ones, I will feel well compensated for my endeavor.

CONTUSED WOUNDS.*

W. R. McMAHAN, M. D., HUNTINGBURG, IND.
Chief Surgeon L. E. & St. L. C. C. R. R.

Contusions and contused wounds form a large and important class of railroad injuries. A contusion is a crushing or laceration without breaking the skin or fracturing the under lying bone or bones and involves cellular, muscular, vascular and nervous tissue, in the order named. A contusion may be so slight as to be scarcely noticeable, or it may be so extensive and severe as to involve a large portion of the trunk or an entire extremity and result in the loss of a limb or life. It is characterized by swelling, fever, pain and discoloration. The swelling is at first due to the rupture of blood vessels, which may be large or small, and the diffusion of blood in the intermuscular and cellular tissue spaces; later by the transudation of serum and cell proliferation, nature's method of repair

The fever which usually follows a contusion

*Read before the Air Line Surgeon's meeting April 28, 1898, Princeton, Ind.

is due to the absorption of "fibrin, ferments and nucleus" and is generally of a mild form and short duration. The pain is either due to the injured nerve filaments or to the distension of the parts by the effused blood. The discoloration may be seen at once if the contusion is superficial, but if it is deep down in the tissues it may be several days before it makes its appearance. It is first blue, then green, then yellow, and lastly fades away. The object in treatment is to protect the parts from infection and assist nature by position, pressure and local application in the absorption of the effused blood and restoration of the injured parts.

We cannot lay down any fixed and fast rules for treatment that will apply to every case, but there are certain leading indications that are alike in all cases, and in order that I may be able to give you my views in regard to how to treat these leading indications we will divide contusions into three classes: slight, severe and very severe.

To illustrate: A man has his hand mashed while making a coupling, skin and bones not injured, the hand is hot, swollen, painful and discolored, circulation in fingers good. The first thing to do is to cleanse the hand and forearm thoroughly and render them aseptic, cover with antiseptic gauze, absorbent cotton and roller bandage firmly applied; place the hand in a sling, give him a saline cathartic and an opiate if indicated, and tighten the bandage from time to time as it becomes loosened. This is usually all the treatment that is necessary in slight contusions and recovery takes place in from six to ten days. If after the first dressing the swelling should increase and the hand become very hot and painful it will be necessary to apply cold to the hand over the antiseptic dressing, either by the application of an ice bag or ice water through a Leiter's coil.

A Leiter's coil can be improvised by taking twenty feet of rubber tubing and wrapping it around the wrist and hand a number of times, put one end of the tubing into an elevated basin of ice water and the other end into a waste basin on the floor, then by suction the flow will start and continue indefinitely if the reservoir is supplied with water. We can use hot or cold water through the coil as seems indicated in any given case and forms the best method of regulating the temperature in all cases of contusions and contused wounds of the extremities.

Suppose a man has his forearm caught between the drawbars in such a way that the force was expended on the soft tissues, rupturing either the ulnar or radial artery. On examination we find the forearm enormously distended with blood, the hand and fingers are cold, absence of ulnar or radial pulse, and that his general condition is bad from the combined effects of shock and loss of blood. The first thing to do is to cleanse the hand, forearm and arm and get it in an absolutely aseptic condition, cover the injured surface with a thick layer of antiseptic gauze and over this a thick layer of aseptic absorbent cotton, and over all a flannel roller bandage very firmly applied.

Then introduce through this antiseptic dressing an aseptic aspirating needle and remove as much of the extravasated blood as possible; as the blood is removed the flannel bandage will contract and by its pressure prevent further bleeding.

The external pressure from the bandage does not interfere with the collateral circulation one-half as much as the same amount of internal pressure would from effused blood. After removing the blood use hot or cold water through the Leiter coil as seems to be indicated, and over the antiseptic dressing. If the patient is still suffering from the shock give him a hypodermic of strychnia and digitalin and morphine if necessary to control the pain.

The after treatment must be varied to suit the indications as they arise.

If the extravasated blood is removed by aspiration it will hasten recovery and there will not be so much danger of traumatic aneurism following the injury.

In very severe contusions of the arm or thigh rupturing the brachial or femoral artery, we usually find the patient profoundly shocked and anæmic from the loss of blood. The blood is diffused into the inter muscular and cellular tissue spaces, distending the limb to its utmost and continues to flow until the pressure in the effusion is near that of the ruptured artery; this pressure diffused through the tissues impairs or cuts off the collateral circulation upon which the vitality of the

limb depends, and we find the limb cold and pulseless. The first thing to do is to give the patient a hypodermic injection of morphine and strychnia and apply artificial heat to his extremities.

As soon as his general condition will warrant, place him under the influence of ether, shave the limb and render it absolutely aseptic, then with aseptic hands and instruments make a long incision over the hæmatoma and parallel with the limb, turn out the blood clots and ligate the bleeding vessel or vessels, irrigate the wound with a 1-3000 bichloride solution, provide for ample drainage and close the wound with sutures and dress antiseptically, envelop the limb in hot flannels or a Leiter's coil and meet indications local and general as they arise and vary from day to day.

If the collateral circulation is sufficient to nourish the limb below the point of ligature the patient will probably recover with a useful limb; if not, the limb will become gangrenous and will have to be amputated. In contusions we may have suppuration from either one of two causes: There may be disease germs floating in the blood current which find a lodgment in the injured tissue or effused blood and set up destructive inflammation; or there may be vesicles or blisters formed over the contused parts, and through these infection may occur if antiseptic precautions have not been taken. Hence the importance of aseptic precautions in the treatment of all contusions.

Contused wounds, like contusions, may be very slight or very extensive and involving vital parts, that may result in the loss of life or limb. They differ from contusions in that the skin is lacerated or torn and blood escapes from the wound instead of being diffused amongst the tissues. The first thing to do in treating a contused wound is to thoroughly cleanse it, ligate all bleeding vessels, trim or cut off all devitalized tissue, provide for drainage, approximate the sides of the wound either with or without sutures, and dress antiseptically.

The after treatment must be varied to meet local and general indications as they may arise.

Annual meeting, Toronto, Canada, July 6, 7, 8, 1898.

FRACTURES IN AND NEAR THE ELBOW JOINT.*

By S. H. Shoptaugh, M. D., Princeton, Ind.

Fractures in and near the elbow-joint are of special interest to the surgeon, because of their frequency and difficulties experienced in treating them successfully.

I know of no class of cases that requires greater surgical skill to diagnose and properly reduce than these, and almost all such cases worry the surgeon for fear of an ankylosed joint, and the impaired usefulness of the arm. The fracture may occur through any of the osseous prominences and may be complicated with dislocation, also laceration of the soft parts covering them. In most cases swelling comes on rapidly, which tends to obscure materially the nature and extent of the injury.

In the treatment of such cases the anatomy should be well understood, as this is the key to the successful diagnosis and treatment; as an auxiliary, an anæsthetic is invaluable, procuring relaxation as far as possible, and then it is often no easy task to properly diagnose the case, as in many instances sufficient time has elapsed to permit extensive swelling.

I have always felt satisfied in any case where I am sure of a correct diagnosis; but when I am not sure, I am uneasy as to results. It is to be hoped a new era will dawn in the treatment of such injuries, as has been the case with antiseptics in lacerated wounds.

I desire to report a case that I was called to treat July 1, 1897. A boy 15 years old fell from a high fence, the entire weight of the body falling on the left arm. I saw the case in about three and one-half hours after its occurrence, found the elbow-joint very much swollen, and he would not allow it touched until an anæsthetic was administered. After getting him fairly under the influence of ether, I examined the joint, but it was so much swollen I could not determine the exact condition; it occurred to me to apply an Esmarch bandage in hopes that I might reduce the swollen condition. I did so, commencing at the hand and continuing it to armpit. I let it remain for a few minutes, then commenced to unwrap it from the hand up, leaving the last few turns of

*Read before the L. E. & St. L., C. C. R. R. Surgeon's meeting April 28, 1898.

the bandage intact. I found the arm pale and bloodless, no longer swollen, the congestion and œdema was for the time gone; then I could readily detect a fracture of the internal condyle of the humerus. The arm was dressed with an angular splint, and placed in a semiflexed position.

The position the arm should be placed in in injuries of the elbow-joint as a rule should be the semiflexed position. In case of fracture of the olecranon, however, the straight splint might be used with arm extended, and better results obtained.

This was my first and only experience in using the rubber bandage in such injuries and the result was so satisfactory that I feel it a duty to use it under similar circumstances, and would like for the profession to try the experiment.

TRAUMATIC ANEURISM.*

By Julius Kohl, M. D., Belleville, Ill.

John B, a stout, healthy man, 35 years old, section laborer in the employ of the L. & N. railroad, in riding over the track on a hand car, struck a signal torpedo. His left leg, which was extended over the car, received the principal charge of the explosive. A mass of shell and (powder) explosive material entered the integument over the lower part of the gastrocnemius muscle, passed over it, making its way into the popliteal space, where it lodged in the sheaths of the muscle without perfecting an exit.

It was evident that this long tract demanded attention. A free incision from one end to the other was made. This enabled a thorough cleansing of the wound. Nevertheless severe inflammation set in and it took many weeks of close attention to subdue septic fever and perfect a cure.

About three months after the accident, when the patient was able to get about on crutches, a swelling on the anterior part of the leg became noticeable. The point of prominence was about seven inches below the knee, this increased from day to day. I gave it the necessary attention, treating it principally with fomentation and poultices. There was not much pain. After the lapse of three weeks, I one day thought that I could detect enough fluctuation to warrant an opening. This was made over the inter-osseous space at the point mentioned. When the knife entered, a stream of blood spurted several feet high. I had simply neglected the usual precautions of diagnosis and had opened an aneurism.

There I was, a mile away from my office, without sufficient armamentarium and help. In the absence of anything better I put my left index finger in the opening, holding the hæmorrhage in check until assistance arrived. I made sufficient opening, the patient being, of course, under anæsthestic, to reach a point for the ligation of the artery. This was a tedious, difficult piece of work. The two bones left little space between for free manipulation. It was accomplished, however, after an hour's search. It proved to be an aneurism of the peroneal artery, a branch of the posterior tibial.

The aneurismal sac was situated longitudinally between the two bones and was at least seven inches long. Within the coagulum I found a piece of shell, the size of a small finger nail. The patient made a slow, but good recovery. The atrophy of some of the muscles of the leg produced only a noticeable limitation of motion.

*Read before the meeting of L. E. & St. L. C.C. R. R. Surgeons, April 28, 1898.

DRAINAGE.*

By Chas. P. Cook, M. D., New Albany, Ind.

"To drain or not to drain" has been a well discussed subject lately. In my opinion some wounds do better without drainage, while others require drainage of some kind; as to which wounds shall be drained and which not, I will leave to the operator's judgment, for after all discussion it usually is left with each operator to use his best judgment and he will thus have good results.

The simplest way to drain a wound is to leave it open, without suturing it, or only partially suturing it and leaving an angle open.

With the open method may be combined sprinkling the wound with antiseptic powder or fill the deep cavities with dressing material possessing a greater or less absorbing power, such as strips of iodoform gauze. The aseptic

*Read before the L. E., St. L., C., C. Railway Surgeons' meeting, April 28, 1898.

packing of wounds is an excellent method of drainage, as it absorbs the secretions and causes it to remain aseptic. Wounds which have thus been left open can, after a few days, when the packing has been renewed, be closed by secondary suture to hasten the healing process.

If we wish to close large, deep wounds which have not been infected so as to obtain rapid healing, with primary union or direct agglutination of the tissue, without formation of pus, as in amputations, resection of joints, etc., we may take proper steps to conduct off the secretions of the wound by drains inserted into the deepest part of the wound. The ordinary vulcanized rubber tube with lateral openings, and as large a caliber as possible may be used, and while not too long, they must be so inserted as to render easy the escape of secretion from every part of the wound; and therefore should reach the deepest part of the wound. The drainage tube is secured in position by a stitch taken in the end of the tube or a disinfected safety pin, and thus prevented from slipping into the wound. The drain should be removed from the fresh wound at the same time that the stitches are, or before, say the second, third, fourth or seventh day, according to the nature of the case and size of wound. If it is used in a suppurating wound the drain is taken out when suppuration ceases and under such conditions it is best not to remove the drainage altogether at one time, but first to shorten the tubes and gradually take them out.

I like drainage tubes as short as possible and of large caliber, because they do not easily become plugged up and there is no necessity to empty them out with syringe and antiseptic solution, thereby irritating the wound and forcing it apart by these injections. This is true especially in all fresh wounds; even the washing out of a suppurating wound with antiseptic solution by means of an irrigator is often entirely unnecessary and may do harm; but this brings up the subject of irrigation and I will leave it.

Besides rubber drainage tubes, there are decalcified bone, glass, silver, aluminum and tubes made from coil wire. A good way to make bone drainage tubes is to take bones from fowls and other birds, boil them free of the soft parts and then place them for ten to twelve hours in a mixture of 1 part hydrocholoric acid and 2 parts of water. The ends of the bones are cut off with scissors and their interior cleaned out with a stout wire, after which they are boiled in 5 per cent carbolic acid solution and in which solution they are kept until used. The objection to decalcified bone drains is that they are too quickly dissolved, sometimes even before they have accomplished their purpose.

To prevent rubber drain tubes from becoming too soft, they may be hardened by placing them in concentrated sulphuric acid for about five minutes (the larger size somewhat longer), then wash the tube in 75 per cent alcohol and store them in 5 per cent carbolic acid solution or one or two thousand solution of bichloride. The red rubber tubes are better than the gray or black for this process.

Capillary glass drainage in the form of spun glass, catgut strands, horsehair, have their place, but in my opinion rubber and glass tubes or packing with sterlized gauze is by far the best, and the other methods are suitable for small wounds only.

Immediate amputation of limbs that have suffered from an injury attended with considerable loss of blood should always be avoided when possible. Wrap up the limb in copious aseptic wet dressings and wait until the patient has somewhat recovered from his loss of blood. Saline transfusion and copious saline enemata will serve a very useful purpose.—Int. J. Surg.

In cases of coma in which encephalic lesions have occurred, there always is, as soon as shock is over, an increase in the temperature. In alcoholic coma the temperature is lowered. In apoplexy the temperature is first subnormal, then nearly normal, and if it rises it is a nearly sure indication of a fatal ending.—Int. J. Surg.

In cases of fracture, non-union is frequently due to the presence of syphilis. It is well, as a matter of routine, to inquire as to the existence of this disease in any case of bone injury, since active anti-syphilitic treatment will greatly promote union and repair in any case in which the disease exists.—Int. J. Surg.

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NOTICE TO MEMBERS.

In other columns will be found all the information available at present in regard to the annual meeting. This includes a list of hotels and boarding houses, a description of the Muskoka Lake trip, etc. We shall give the hour of departure of the special train on the Grand Trunk in our next issue.

GASTRORRHAPHY OR GASTROPLICATION.

Among the novelties in surgery is the operation devised for the relief of dilated stomach and known as gastrorrhaphy, or better gastroplication. It is intended to relieve cases of so-called atonic dilatation, in which there is enormous bulk of the organ without any obvious cause at the pyloric valve or in the duodenum. The indications for its performance are practically limited to cases of dilated stomach where the digestive function is impaired, although its originator mentions its use in threatened perforating ulcer.

While the operation was forecast by Ewald, it was first performed by a Swiss surgeon, Bircher, who published a series of three cases in 1890. After opening the abdomen a pleat is taken in the anterior wall by lifting the greater curve up to the lesser and suturing it. Some thirty-five sutures were taken, passing through the serous and muscular coats of the greater curvature and through the same coats at the lesser curvature. The surfaces brought together were only about one-half inch broad and liable to be torn loose if any strain was brought to bear on the adhesions.

To remedy this defect Weir, of New York, in 1892 modified the operation so as to have a larger surface in apposition. His method is as follows:

"In the center of the space between the upper and lower borders of the stomach, a dimpling in of the gastric wall was made, first by the pressure of a sound to the depth of one inch. A row of eight or ten interrupted silk sutures was now made passing through the serous and muscular coats for a distance of from six to eight inches, and the sound was then withdrawn. A second series of sutures about one inch from the first was again made, dimpling in an additional portion of the stomach wall and in a similar manner. A third and fourth row were applied until through a distance of some four or five inches the greater curvature was applied to the lesser. When the row was completed a double fold of the stomach equal to the breadth of the hand and nearly its length was formed."

Brandt introduced another modification in the same year. He made folds on both the anterior and posterior walls, requiring some two hundred stitches. The operation is quite lengthy and does not seem to have been favorably received.

In the London Lancet for April 30 Mr. Berkeley Moynihan reports a case of this operation. The patient was a man of 47 who had suffered from indigestion and occasional vomiting for the last five or six years. He

felt comfortable for an hour or so after meals, then epigastric uneasiness rapidly developed until pain became acute and intolerable. He had been given continuous medical treatment without avail; this included all drugs acting on the stomach, aids to digestion, and intestinal antiseptics. The patient had been taught to practice lavage of the stomach, and employed it twice daily with great temporary benefit.

On examination the man was found to be thin, wasted and with a sallow complexion, the stomach was enormously dilated and was computed to fill about two-fifths of the abdominal cavity. As nothing abnormal could be felt at the pylorus, gastroplication was decided on. Still another modification was made by Moynihan. He folded the anterior wall up into several pleats and passed twelve sutures about one inch from each other, each suture like a purse string, picked up the wall at nine points. Thus the anterior wall of the stomach was all pleated except a small area at each end. The patient recovered rapidly from the operation, increased in weight and has been able to indulge in a fairly liberal dietary.

Altogether fifteen cases have been operated on, with but on death. All operators, save Wölfler, are in favor of the method. Wölfler believes that the original conditions underlying the dilatation will cause its return One of Bircher's cases has remained well for over two years at the time of his report, and Bennet's case seems to be the only one reported thus far in which the symptoms returned.

Translations.

Direct Subcutaneous Ruptures of Large Arteries with Consecutive Gangrene.

By Felix Lejars.

(Continued from page 9.)

PATHOLOGICAL ANATOMY.

Arterial lesions consequent on contusion and without any wound are of multiple forms and different degrees of gravity, while their common end is the obliteration of the artery. We may have: 1. Total rupture. 2. Rupture of the middle and inner tunics, with curling up of the endovascular tissues. 3. Isolated rupture of the inner tunic, either complete or incomplete.

1. Total Rupture.—The solution of continuity comprises the whole circumference of the artery whose ends separate; however, the section is never clean cut. In Kirmisson's case both the femoral artery and vein were ruptured and the four ends terminated in a vast aneurismal pouch, but the section of the vessels was irregular.

Cival has published a very interesting case of complete rupture of the popliteal artery. After amputation of the thigh an injection into the end of the artery gushed out into the popliteal space and it was found that the artery was literally divided. The two ends were retracted and separated from each other. The calibre appeared notably smaller. These ruptures by crushing never occur without a stretching and curling up of the tunics, which sometimes causes immediate obliteration.

In Pozzi's case the femoral artery was completely ruptured, and the extremities separated nearly an inch. The upper end was clubbed, resembling an artery severed by a bullet. It was closed by a clot one and one-fourth inches long, extending back to one of the perforating branches. The lower end was composed principally of a long extremity formed by the outer tunic; a very dense fibrous clot filled this end also for nearly two inches.

2. Rupture of the Middle and Inner Tunics.—In this variety the tunica adventitia having resisted, the continuity of the vessel is thus preserved and hæmorrhage prevented. The other tunics obstruct the lumen more or less completely. Sometimes the vessel externally appears normal; more often the thrombosed segment, discolored by the blood, is easily distinguished from the rest of the artery. At other times the wounded segment has the aspect of a double swelling, separated by a retracted part. On opening the vessel we find it closed by a clot which tapers off at its central end, while the other is prolonged for a considerable distance along the trunk of the principal artery or its branches. We shall see presently what difficulties ensue as a result of these extended thromboses in the establishment of the collateral circulatory. The ruptured tunics are irregularly fringed and the ragged ends project into the lumen, providing

innumerable lodging places for the blood to coagulate.

3. Isolated Rupture of the Inner Tunic.—This is perhaps the most frequent form. This may also involve the whole circumference, and the ends will curl up. "Dissecting the popliteal," writes Potherat, "I at first found it absolutely intact externally; on opening it, however, I found a fibrinous clot in the interior, filling the vessel which was thus obstructed to just above the bifurcation. The explanation of this clot formation was furnished by the inner tunic, which was ruptured and retracted toward the interior of the vessel."

From a clinical standpoint it is important to remember that some of these arterial lesions are obliterating from the first; others manifest themselves by a slow coagulation and retarded thrombosis, which may require several days to complete.

The large satellite veins may be ruptured at the same time. This has been verified in eight of the thirty-four cases, and was probably present in another. It is possible for the artery to be completely ruptured without involving the vein.

MECHANISM.

Ordinarily this is complex and we may distinguish different elements, which intervene either isolated or in combination.

1. Crushing, properly so-called, on a deep osseous plane, occasionally the section is made by a bony ridge. 2. Bursting. 3 Tearing.

In my opinion crushing is always more or less responsible; it occurs on account of the structure of the walls of the arteries. The different resistance and friability of the outer tunic and the two inner ones. The course of events after ligation has been studied too often to detain us long. In brief, we find that from the effects of a circumscribed shock, the inner and middle tunics break the first.

I may add that an artery in the living body filled with blood and in full possession of its normal tonus, gives different results from an experiment on the cadaver. The difference in the friability explains also why the rupture in crushes is often partial, the adventitia not being involved. These crushing injuries do not always follow direct shocks; the violence may act obliquely on the vessels, as nearly always happens after being run over.

(To be continued.)

Miscellany.

The Special Train.

For the accommodation of the western members of the International Association of Railway Surgeons who will attend the convention at Toronto, July 6-8, the Grand Trunk has arranged to run a special train from Chicago to Toronto, leaving Chicago the afternoon of July 5. Full particulars can be obtained and berths in Pullman cars reserved by communicating with L. R. Morrow, city passenger agent, Grand Trunk Railway, 103 Clark street, Chicago.

Transportation to Toronto.

Up to going to press favorable replies had been received from the following roads, with names of officers signing letters.

As pointed out in last issue, the fact that a road is not in the list is no sign that it will not extend the usual courtesies:

Ann Arbor Railroad, H. W. Ashley, general manager.

Atchison, Topeka & Santa Fe, J. J. Frey, general manager.

Atlanta & West Point and Western Railway of Alabama, Geo. C. Smith, president.

Buffalo, Rochester & Pittsburg, G. E. Merchant, assistant to president.

Burlington & Northwestern and Burlington & Western, R. Law, manager.

Charleston & Western Carolina, J. B. Cleveland, president.

Chattanooga, Rome & Southern, C. B. Wilburn, president.

Chicago & Alton, Jas. Charlton, general passenger agent.

Chicago & Eastern Illinois, M. J. Carpenter, president.

Chicago, Great Western, C. P. Stembel, assistant to general manager.

Chicago, Indianapolis & Louisville, W. H. McDoel, vice-president and general manager.

Chicago, Milwaukee & St. Paul, W. G. Collins, general manager.

Chicago, Peoria & St. Louis, H. W. Guys, general manager.

Cincinnati, Hamilton & Dayton, C. G. Waldo, general manager.

Cleveland, Canton & Southern, J. W. Wardwell, receiver and manager.

Cleveland, Chicago, Cincinnati & St. Louis, C. C. Shaff, general manager.

Cleveland & Marietta, W. A. Ruedwin, president.

Colorado Midland, Geo. W. Ristine, president.

Columbus, Hocking Valley & Toledo, N. Monsarrat, receiver.

Denver & Rio Grande, E. T. Jeffrey, president.

Evansville & Terre Haute, H. C. Barlow, president.

Fitchburg Railroad,

Florida Central & Peninsular, D. E. Maxwell, second vice-president.

Humeston & Shenandoah, E. C. Murphy, general manager.

Illinois Central, J. T. Harahan, second vice-president.

Iowa Central, L. M. Martin, general manager.

Jacksonville & St. Louis, C. M. Stanton, general manager.

Kansis City, Watkins & Gulf, Thos. Saunders, general manager.

Keokuk & Western and Des Moines & Kansas City, A. C. Goodrich, vice-president.

Lake Erie & Western, D. S. Hill, superintendent.

Lehigh & Hudson River, G. Burt, president.

Lexington & Eastern, H. C. McDowell, president.

Louisville, Evansville & St. Louis Consolidated, Geo. T. Jarvis, general manager.

Missouri Pacific, S. S. Weyl, chief clerk.

Northern Pacific, J. W. Kendrick, general manager.

Oregon Short Line, W. H. Bancroft, general manager.

Oregon Railway & Navigation Company, A. L. Mohler, president.

Pennsylvania Company, J. B. Hutchinson, general manager.

Quebec Central of Canada, Frank Grundy, general manager.

Seattle & International, L. S. Miller, general manager.

Southern Railway, W. W. Finley, second vice-president.

St. Louis, Iron Mountain & Southern, S. S. Weyl, chief clerk.

St. Louis, Peoria & Northern, W. E. Guy, president.

Terre Haute & Indianapolis, J. J. Turner, general manager.

Texas & Pacific, L. S. Thorne, vice-president.

Toledo & Ohio Central, J. M. Ferris, general manager.

Toledo, Peoria & Western, E. N. Armstrong, general superintendent.

Toledo, St. Louis & Kansas City, R. B. F. Pierce, receiver.

Union Pacific, E. Dickinson, general manager.

Union Pacific, Denver & Gulf, T. F. Dunaway, general superintendent.

Wabash, J. Ramsey, Jr., vice-president.

Washington & Columbia River Railway Company, Jos. McCabe, general manager.

Western New York & Pennsylvania, R. Bell, general superintendent.

West Shore, J. D. Layng, second vice-president.

West Virginia & Pittsburg, A. H. Kunst, vice-president.

Wisconsin Central, H. F. Whitcomb, general manager.

Toronto Hotels.

The Rossin House, the headquarters of the association, is the most conveniently situated, being on King and York streets, King being the main street, and York street leading from Union station, where all trains arrive, being two blocks from hotel.

The Walker House and Grand Union are in immediate proximity to the Union station. Other centrally situated and suitable hotels are the Arlington, Queen's, Palmer, Elliot House, the latter being a good family hotel, two minutes' walk from the convention hall.

Electric cars pass all hotels in this list and transfer may be had to all connecting lines, so that members will have no difficulty in conveniently reaching the meeting place, which is generally known as the Normal School buildings—St. James Square. Church street cars

and Yonge street cars pass near the buildings.

LIST OF LEADING TORONTO HOTELS AND BOARDING HOUSES.

Hotel and Name of Proprietor or Manager.	Accom	Rates. Per Day.	Per Week.
Queen's....McGaw & Winnett	400	$3.00 to $5.00	
Rossin House.....A. Nelson	400	2.50 to 4.00	Special.
Arlington.....C. J. Beacham	200	2.00, 2.50, 3.00	"
Walker House .David Walker	200	2.00 to 2.50	"
Grand Union..Chas. A. Campbell.....	200	2.00	
Palmer House (American plan) J. C. Palmer.....	200	2.00	$8.00 to $10.50
Kensington House (European plan) ....J. C. Palmer	150	0.50 to 1.00	
Elliott House.....J. W. Hurst	100	2.00	Special.
Athlete Hotel (European plan)..... John F. Scholes	..	1.00 and up'd	
Lake View J. H. Ayre	100	1.50 to 2.00	8.00 to 10.00
Albion..... ..John Holderness	175	1.00 to 1.50	5.00 to 7.00
Richardson House .S. Richardson.....	100	1.00 to 1.50	Special.
Rosedale .....John Elliott	50	1.00 to 1.50	"

SCENE ON MUSKOKA LAKE.

Boarding House and Name of Proprietress.	Accom	Per Day.	Per Week.
Frewen House, 7 Queen's Park Mrs. Lawlor	25	$1.50 and up'd	Special.
Mrs. Duckworth's, 50 St. George Street.....	30	1.00 to 1.50	"
Gleneholm, 254 Jarvis Street. Mrs. Dick..... ..	50	1.00 to 1.50	$ 5.00 to $ 8.00
Mrs. Carroll's, 421 Jarvis Street.....Mrs. Carroll	20	1.00	5.00 to 6.00
Victoria Villa, 218 John Street Mrs. B. Brown.....	40	1.50 to 2.00	10.00
Mrs. Mead's, 266 Bloor Street West.....	20	1.50 to 2.00	9.00 to 15.00
Mrs. A. R Johnston's, 194 Bloor Street West.....	20	1.00 to 1.50	6.00 to 9.00
Mrs. Ferguson's, 189 Bloor Street East	40	1.00 to 2.00	7.00 to 10.00
Elm House, 32 John Street. Mrs. Thompson	30	1.00 to 1.50	6.00 to 7.00
Pine Villa, 16 Spadina Road. Mrs. Mason..	25	1.50 to 2.50	8.00 to 12.00

The Muskoka Lake Excursion.

Dr. Bruce L. Riordan, chairman of committee of arrangements for Toronto meeting, reports that he has just returned from a trip over the route of proposed excursion to the members of the International Association of Railway Surgeons, which is to take place the day after closing of convention. Through the kindness of Mr. C. M. Hays, general manager of Grand Trunk railway system, and Mr. A. P. Cockburn, manager of the Muskoka & Georgian Bay Navigation Company, the members attending the Toronto meeting will be treated to a complimentary excursion to the Muskoka Lakes.

The programme, subject to modification, is as follows: Saturday morning, July 9, leave Toronto by special train, which will run through a very pretty country to Muskoka wharf, where we will immediately embark on the boat, or boats, of the Muskoka & Georgian Bay Navigation Company. The steamer will sail as soon as possible, passing up Lake Muskoka. The lake is dotted with islands, making the scenery most pleasing and interesting; at the head of Lake Muskoka we pass through the lock (a very short canal). This place is called Port Carling and lies between Lakes Muskoka and Lake Rosseau, into which we now steam. From this point we proceed through Lake Rosseau to Port Sandfield, which is at the junction of Lake Rosseau and Lake Joseph. Here we will disembark in

the grounds of the Port Sandfield Hotel, where dinner will be served. Arrangements have been made to serve the whole party at the same time.

It is proposed, if the weather is fine, to have the meal served on the broad verandas and in the pavilion on the lawn of the hotel, so that the visitors may drink in the beautiful scene spread before them while they drink and eat a more substantial spread.

rangements, will do everything in their power to make the visit an enjoyable one.

As a description of the Muskoka district may be of interest to those who propose attending the Toronto meeting, as well as to some who may not be so fortunate, I send herewith a short descriptive article on this region of Canada, and also a few cuts, illustrating the scenery, but to enjoy it everyone must see it themselves and feel the fresh, in-

SCENE ON LAKE JOSEPH—MUSKOKA LAKE DISTRICT

After dinner embark on steamer and, retracing our way, land at the wharf of the Gravenhurst Sanitorium, where the visitors will be given 5 o'clock tea on the lawn of the institution.

After allowing time to inspect the buildings, grounds, etc., we would again return to the steamer and proceed to wharf, where our train would be waiting to take us back to Toronto, arriving there early in the evening. The people of Gravenhurst, and on the route of our excursion, from assurances which have been given to your chairman of committee of ar-

vigorating atmosphere, and become possessed of a "Muskoka appetite."

Muskoka as a Summer Residence and Health Resort.

Of late years the beneficial effects of climate, pleasant surroundings and change of locality have been brought more and more into prominence in the treatment of chronic diseases. The study of climatology in reference to alleviation of suffering, the amelioration of symptoms or the production of a thorough cure is

one of great interest and importance to the medical profession and to mankind at large.

The region of the Muskoka Lakes, deservedly called the Highlands of Ontario, is a most delightful district in which to spend a few weeks or months. It is perhaps but too little known as a place for rest, recreation or health; a land of forests, amidst which lie over seven hundred lakes of clear, limpid water, inclosed by rocky bluffs and headlands and dotted with islands, most of which are wooded, while others rise sheer from the water's edge and show but little vegetation, save beautiful mosses and lichens, which grow freely on the exposed granite and gneiss.

Although the lakes of the district are so numerous there are three principal sheets, namely, lakes Muskoka, Rosseau and Joseph, the largest being twenty-two miles in length, while all

MUSKOKA WHARF, G. T. RY.—TAKE STEAMER HERE FOR LAKE TRIP.

vary in width, with channels of a few hundred yards to open stretches of water, about six miles wide.

In these three lakes there are upward of four hundred islands, on many of which are the cottages of summer residents, while on others numberless choice spots remain where the camper is at liberty to pitch his tent. The outline of the lakes is indented by countless bays and streams and sheltered coves, the shores, as a rule, being rocky and wooded to the margin, while here and there are stretches of sandy beach, offering excellent facilities for bathing.

The scenery of Muskoka has a peculiar charm. Its varied character gives it an individuality. In the autumn the beeches and maples, clothed in ever-changing tints of gold and red, standing out with indescribable brilliancy in the clear sunlight of a cloudless sky and contrasting with the quiet green of the balsam, pine and arbor vitae, present a picture to which no painter can do justice.

In the late fall and early winter it is the sportsman's paradise. In their respective seasons, partridge, duck and geese are numerous, while deer are found in gratifying numbers, and the sight of a bear is not at all uncommon during the hunting season. Song birds and small animals abound, while the lakes are well stocked with bass, pickerel, salmon trout and maskalonge.

The botanists will find here a very interesting flora, almost distinct from that of the region of the great lakes; especially will he be interested in the aquatic flora and the great variety of cryptograms.

Along the shores of the lakes may be found modest hotels and good boarding houses; the rates are certainly lower than at any other resort, while the fare is good and substantial, suppying perfectly the peculiar craving for food known proverbially among those who have visited the region as the "Muskoka appetite." No district is so free from extortion, nowhere can the health and pleasure-seeking tourist enjoy himself so much for so little money.

The health-restoring properties of the district may be ascribed to a number of features, an elevation of eight hundred feet above the sea and one hundred and sixty above the level of the Georgian Bay, a wholesome, bracing air, laden with balsamic odors, freedom from dust, high, rocky, ground, giving excellent drainage and entire freedom from marshy ground. Malaria is unknown. The rock formation being altogether Laurentian (granite), the water is soft and entirely free from lime. The freedom from dust probably explains the great benefit received by those suffering from hay fever. Asthmatic patients also are relieved of their distressing symptoms by a stay in the region.

On the shores of Muskoka Lakes, two miles from Gravenhurst (Muskoka Wharf), is the Muskoka Cottage Sanitarium, which was opened on September 1, 1897. It is devoted

to the treatment of pulmonary phthisis. The site was chosen after a careful comparison of its advantages with those of various other spots. Facing the lake to the south, protected by a huge ridge of rock to the north and northwest, surrounded by a hardwood and hemlock bush, it possesses indeed a most admirable situation. Patients are received only in the early stage of the disease. A number of cottages are now under course of erection, so that during the summer there is expected to be an accommodation for about sixty. Every provision is made for the outdoor life, freedom from worry and care, and the cultivation of a vigorous appetite. The lake, with its numerous islands, forms an ideal spot for boating, while the walks in the woods and over the rocks bring back strength and vigor. There are ascents of various grades throughout the grounds, and rock climbing may be indulged in by those for whom it is advisable. The bright, clear days of winter have been found very invigorating and a temperature of zero or 10 Fah. is thoroughly enjoyed by the patients as they sit on the broad piazzas, well wrapped in furs and rugs, reading, chatting or sleeping.

The results obtained thus far in fall and winter have been quite satisfactory. It is too early yet to present a tabulated report of the cases already under treatment, but it is certainly remarkable how, after a very short stay, there is a marked gain in weight, a restoration in appetite, a decrease or total subsidence of cough, improved sleep, and a great increase in the general well-being of the patient.

The "Muskoka Lakes" are 112 miles from Toronto, 145 miles from Hamilton, and are reached by the northern division of the Grand Trunk railway system. The trains connect at Muskoka wharf with the boats of the Muskoka Navigation Company, which reach all points upon the lakes, so that the farthest stopping point is but a day's journey from Toronto.

Each year sees an increase in the number of visitors to this district. It would be difficult to find another region possessing such an endless variety of picturesque nature with such an expanse of fresh water, with an atmosphere so dry and so conducive to health, and at the same time affording facilities for sport with rod and gun.

PRELIMINARY PROGRAM FOR THE ANNUAL MEETING I. A. R. S.

The following papers have been promised:

Mr. E. J. Rich.—"The Claim Department of Our Eastern Railroads and Its Relation to Medical Organizations."

Dr. P. Daugherty.—"Ideal Results in Major Operations, with Report of a Case."

Dr. G. W. Hiett.—"The Demand for a Few Simple Principles in the Practice of Modern Surgery, Embracing a View of Surgical Gangrene, with Report of a Case."

Dr. F. C. Vandervort.—"Fever and the Fever State."

Dr. W. H. Coffey.—"Conservatism."

Dr. Howard J. Williams.—"Four Cases of Probable Laceration of the Brain from Railway Injuries."

Dr. P. H. Bryce, Secretary of the Provincial Board of Health, Toronto, Can.—"Practical Co-operation Between Public Health Authori-

ties and Railway Authorities Regarding the Transportation of Corpses."

Dr. A. I. Bouffleur.—"Cerebral Contusions."

Dr. C. F. Leslie.—"Report of a Case of Lightning Stroke, with Accompanying Fracture of Base of skull."

Dr. Francis B. Fite.—"Surgery of Tendons in Infected Regions."

Dr. W. C. Jarnagin.—"Traumatic Neuroses: Their Relations to Suits for Personal Damages."

Dr. M. W. O'Brien.—"A Method of Preventing Sloughing of the Heel in Syme's Operation."

Dr. G. P. Conn.—"Physical Examination of Railroad Employes and its Medico-Legal Significance."

Hon. B. B. Munford, Division Counsel Southern Railway Company.—"Character and Attainments of the Medical Officers of Railroads in Their Relation to the Legal Department."

Dr. S. C. Benedict.—"Spinal Traumatism as a Symptom of Insanity."

Mr. Clark Bell.—"Progress of Medico-Legal Surgery."

Dr. G. R. Dean.—"Common Sense in Surgery."

Dr. S. B. Crawley.—"Some Thoughts on Asepsis and Antisepsis."

Dr. C. P. Gordon.—"General Anæsthesia by Chloroform or Ether, Which? Local Anæsthesia by Cocaine or Eucaine, Which? General or Local Anæsthesia in Enucleation or Extirpation of the Globe of the Eye, Which?"

Dr. J. G. Brodnax.—"Operation for Senile Cataract."

SYMPOSIUM ON SHOCK.

"Nature and Pathology of Shock."—Dr. F. J. Lutz, St. Louis, Mo.

"Pathology of Railway Shock."—Dr. Wyatt Johnston, Montreal, Can.

"Resume of an Experimental Research Into Surgical Shock."—Geo. W. Crile, M. D., Cleveland, Ohio.

"The Varieties and Causes of Shock."—Dr. H. L. Getz, Marshalltown, Iowa.

"The Symptomatology, Diagnosis and Prognosis of Shock."—Dr. Jabez N. Jackson, Kansas City, Mo.

"The Prevention and Treatment of Shock."—Dr. James H. Letcher, Henderson, Ky.

"Is the Symptomatology of Shock in Injuries to the Liver Different from that of Other Injuries of the Same Gravity?"—Dr. S. R. Miller, Knoxville, Tenn.

"The Prevention of Shock."—Dr. Hugh M. Taylor, Richmond, Va.

Dr. J. G. Tuten.—"Is Shock a Predisposing Cause for the Development of Consumption?"

Extracts and Abstracts.

Apparatus for Sterilizing Instruments with Formaldehyde—Experimental Tests.

By H. O. Reik, M. D., and W. T. Watson M. D.

At the recent meeting of the American Medical Association in Philadelphia, Dr. E. A. de Schweinitz, bacteriologist to the Bureau of Animal Industry, United States Department of Agriculture, presented to the Ophthalmological Section a paper treating of the sterilization of instruments by formaldehyde, both in solution and in the gaseous form.

Knives which had been used in dissecting were washed in water and placed in a 1 to 2,000 formaldehyde solution. It was found that in 35 minutes they were completely sterilized.

In testing the effect of the gas a small copper-drying oven was used, and 25 ccm. of 40 per cent formaldehyde solution (the preparation known as formalin) was placed in a small dish in the bottom of the oven. The instruments used were proven sterile, then infected with staphylococcus pyogenes aureus, wiped with dry cotton, placed in the oven, and when tested after 10 minutes showed growth on culture media. When knives infected in a similar manner were rinsed in hot water, wiped dry and placed in the oven, no growth was noted after a 10 minutes' exposure. Forceps treated in the same way required from 15 to 20 minutes. The gas used was obtained by spontaneous evaporation of formalin, but it is important to note that "the solution of the gas was placed in the over some hours before the instruments which were to be disinfected, in order that a sufficient volume of the gas might be present to act immediately upon the organisms adhering to the knives."

The length of time required to disinfect the knives by the formalin solution and the length of time required to generate the gas in the chamber previous to disinfection would materially interfere with the practicability of these methods, for if so much time is necessary to put them in operation, they offer but little advantage over other methods.

Again, we would respectfully suggest that the tests were scarcely conclusive as to the

value of the gas, for might not some portion at least of the disinfection have been produced by the rinsing of the infected instruments in hot water and their subsequent wiping with dry cotton?

We have seen no other report of work in the direction of disinfecting instruments with formaldehyde, although Dr. Valude, in the Revue Générale d'Ophtalmologie for July, 1893, recommended that, "as formalin does not attack metals, it is well adapted for antiseptic solutions in which to keep instruments before and during operations."

The report of Dr. de Schweinitz, however, in connection with the experiments of others to disinfect various objects and large areas, led us to expect that instruments could be more quickly sterilized by the gas if it could be conveniently and rapidly evolved in a small apparatus. We used in our experiments simply an air-tight tin oven with a capacity of 1¼ cubic feet. By the introduction of wooden blocks the capacity was reduced to one cubic foot. Two racks of trays for holding instruments are suspended in the upper half of the box and the gas is manufactured below. We first attempted to secure the gas by spontaneous evaporation. One hundred ccm. (3 1-3 ounces) of the 40 per cent solution, formalin, was placed in an evaporating dish in the bottom of the box, presenting a surface of about 16 square inches. The knives and probes here presented, and which were used in all our tests, were infected with a fresh culture of staphylococcus pyogenes aureus and placed on the racks over the formalin dish. The cover was then removed from this dish, the door of the apparatus quickly closed and evaporation allowed to proceed. At the end of one minute the door was opened, the knife removed and the formalin dish recovered. A culture was made from this knife upon agar and placed in the thermostat. Control cultures were also made from the aureus culture used, in order to be sure of its vitality.

This experiment was repeated with the exception that the time of exposure was lengthened to 2, 3, 4, 5, 10 and 15 minutes. Then a jump of large intervals was made, the tests being at one-half hour intervals up to four hours. In every interval between the tests the door of the box was left open to permit escape of the gas, so that there might be no accumulation of it, and we might thus be able to determine just how long an exposure to the spontaneous evaporation of the gas would be necessary. The time proved much longer than we had expected, and it was only after a two and a half hour exposure that we could feel sure of sterilization. This would evidently not do for practical work and we were compelled to look for some more rapid means.

We did not use formalin for the generation of the formaldehyde gas by heat, for two reasons: 1st, we feared that the heat which would drive off the gas would at the same time vaporize the water which contained it, and thus possibly cause a rusting of the instruments; 2d, we found in paraform a much more convenient substance for the purpose.

Paraform is polymerized formaldehyde and occurs as a light white powder, which can by means of heat be entirely converted into formalydehyde. Commercially it can be obtained in the form of pastils weighing one gram (15.4 grains) each.

The next problem was how to get the gas in the chamber. Should it be generated outside and then introduced, or could we generate it inside the apparatus? To generate it outside has many objections. Our next experiments were made to discover if it were possible to vaporize tablets by means of a lamp inside the closed chamber. We feared that the oxygen contained in the chamber would not support combustion long enough to develop sufficient heat to generate the amount of formaldehyde needed. Our fears in this regard proved to be quite unfounded, but we found that the kind of alcohol lamp used was a very important factor. After using two ordinary alcohol lamps in our possession, we abandoned them for the Schering formalin lamp, which we found more efficacious, generating far more gas with the amount of oxygen at our disposal, and being much more economical in its use of alcohol.

This lamp we find will burn in a closed chamber containing one cubic foot of air for about 1¼ minutes. In that time it will vaporize 35 grains of paraform. The temperature of this apparatus will be raised in this time to less than 30 degrees centigrade (86° F.), so that the element of heat does not affect our results.

This amount (35 grains) of paraform was found to be far in excess of the quantity necessary to disinfect this chamber. We then proceeded to find the minimum amount of paraform required to disinfect the chamber in a reasonable length of time. We vaporized quantities ranging from two grains up to 10 grains for different intervals of time. Even two grains will sterilize the chamber if given sufficient time. Three grains will do it in 15 minutes, five grains in 10 minutes, and 10 grains in seven minutes. We could not proceed in this way indefinitely to use larger quantities and diminish the time, because 10 grains in seven minutes is the full vaporizing capacity of the lamp. Nor is it desirable to increase the amount of paraform, for when the chamber is opened there is an escape of gas into the room which, while not injurious or particularly objectionable, is yet not to be desired. For practical purposes 10 or 15 minutes is a short enough time for the sterilization of instruments, and this can be done with three to five grains of paraform.

The micro-organisms used in these experiments were the staphylococcus pyogenes aureus and the anthrax bacillus. The knives were sterilized by boiling and then infected from slant agar cultures. The germs could in every instance be seen en masse upon the instruments when put into the chamber. After exposure to the gas, cultures were made on slant agar.

One feature of this disinfection by evaporation of the paraform needs a little further investigation. After performing numerous experiments, during which large quantities of paraform were vaporized, there appeared upon the sides of the chamber a thin greasy deposit which afterward became converted into a dry white powder. This, we are informed from the literature on the subject, is paraform which has become deposited again from the gaseous state. We did not in any instance find this deposit visible upon our instruments, still we have the possibility of its adhering in mind, and shall later experiment to determine whether or not it is present, and if so, whether or not it would have a deleterious influence upon wounds.* From literature at our command we believe that there is but little danger from this source.

Another important matter to be considered is whether or not the cutting edge of the instrument is dulled by this method of disinfection. Upon this point we have the opinions of Drs. E. A. de Schweinitz and Swan M. Burnett of Washington, who state that from the use both of the gas and of the liquid formalin there has been no influence whatever upon the sharpness of the instruments.

From these experiments we conclude that:

1st. A lamp will burn in any absolutely closed chamber long enough to generate more than sufficient formaldehyde for its disinfection.

2d. In a chamber of one cubic foot space three grains of paraform in 15 minutes, or five grains in 10 minutes, will accomplish disinfection.

3d. The expense of such disinfection, including the cost of paraform and alcohol, will not exceed one cent, and the labor involved is almost nil.

4th. For the disinfection of small instruments, such as those used by ophthalmologists, otologists, laryngologists and dentists, it is by far the most convenient and speedy method.

5th. This method, probably better than any other designed for the work, carries out the principles of disinfection laid down by Koch, viz., "the absolutely certain destruction of all pathogenic organisms, in the shortest possible time, at the least expense and with a minimum of injury to the object of disinfection."

E. B. Meyrowitz of New York has in preparation an apparatus specially designed by us for the use of this method, and Schering & Glatz will supply pastils of five grains each for use in the apparatus.

In concluding we wish to thank Mr. McShane for permission to conduct these experiments in the city's bacteriological laboratory, and Dr. Stokes for advice and guidance in our work.

DISCUSSION.

Dr. Cullen: Dr. Hurdon is, at the suggestion of Dr. Kelly, now carrying on experiments in this line. The apparatus used contains about six cubic feet, and particular attention has been paid to the sterilization of dressings. Using four pastils, each 15.4 grains of paraform, it was possible to render sterile a piece of gauze that had been dipped in a pure culture of anthrax, in 10 minutes, but if the piece of gauze was wrapped in seven or eight layers of gauze and this bundle enveloped in three thicknesses of foolscap paper, 20 minutes were required for sterilization. The only disadvantage noted was that on opening the box the escaping gas caused considerable irritation of the eyes of those in the room. With regard to the effect on instruments I was glad to hear what Dr. Reik said, because the ophthalmologist's instruments are so delicate, and because Dr. Kinyoun, in a recent report on experiments with formaldehyde, states that gold and silver are not affected, but that the effect on the iron is to cause oxidation.

Dr. Theobald: I was very much interested in the report by Dr. Reik, and I think it would be a distinct advantage if we could have such a sure and easy method of disinfection of our instruments. It is very difficult to submit our instruments to boiling or even to dry heat without dulling the knives, and they also become tarnished when immersed in fluid only for a few moments. To sterilize them by this method would certainly seem to be a distinct gain.

Dr. Watson: I would like to ask Dr. Cullen whether Dr. Hurdon found much deposit on the bandages. I read in a circular issued by the manufacturers of the pastils that after vaporizing the paraform it was readily deposited on woolen goods. We did not find it on the knives at all, and thought possibly this

*Dr. Feik's observation, that the inner surface of the sterlizer becomes coated with a fat-like covering, whilst the instruments do not, may be explained as follows: The metal case conducts heat so rapidly that a condensation of the formaldehyde vapors takes place upon it. This is not the case with the instruments on the shelves; they remain warm, and, having a much smaller surface than the box, no precipitation of Paraform occurs on them. The Schering Formalin Sterlizer is made of tin because it is cheaper and a poorer conductor of heat than copper. The temperature in the chamber is therefore maintained at a higher level, and condensation is diminished.

In regard to the question as to whether Paraform could have any injurious effects upon wounds, we can answer in the negative. The Eka-Iodoform manufactured by the Schering Chemical Works contains Paraform, and its action when used as a dressing is a very excellent one. If large quantities of pure Paraform were employed and applied directly as a dusting powder to wounds, it would undoubtedly cause irritation. But the small amount remaining upon instruments or gauzes that have been sterilized by its means will certainly not do so.

might be due to their smooth surfaces or to the nature of the metal.

Dr. Cullen: The box used was six cubic feet, very large, and Dr. Hurdon has not noticed any deposit.

Dr. Stokes: These experiments are of value when viewed from several different standpoints. It is a good thing to have proved that the spontaneous evaporation of the gas is not a very practical method for the sterilization of instruments, and again it is of value to have shown that the evaporation of such small quantities of the gas from the solid pastils will cause the thorough surface disinfection of such a chamber.

This work seems to show that it is possible to render not only the instruments of the ophthalmologists sterile, but to destroy bacteria on the surfaces of larger instruments, and so this method may be applied in general surgery.

I am also glad to learn from Dr. Cullen that several layers of gauze can be disinfected even when wrapped in paper, for that seems to show that the ordinary dressings used by the ophthalmologists, for instance, may be rendered sterile. I think the general experience with formaldehyde has shown that with finely woven textures, like cotton, penetration is a difficult thing to attain.

In regard to Kinyoun's experiments, they were performed in a large room and the gas was allowed to remain in contact with the iron for some time. I hardly think that any harm could be done the instruments in just the few minutes they are exposed in this chamber, but this can be determined by further experimentation.—Bull. Johns Hopkins Hosp.

Supplementary Report on the Sterilization of Instruments by Formaldehyde.

By Dr. H. O. Reik.

The December number of this Bulletin contained an account of the work performed by Dr. Watson and myself with formaldehyde gas, and we stated then that Meyrowitz of New York was making for us an apparatus especially adapted for the use of this method of sterilization. The accompanying cut represents the sterilizer referred to and which I am now using in my daily work. It is of a size suitable for the ophthalmologist, otologist, laryngologist, or other surgeon, who uses comparatively small instruments. Should the general surgeon or the obstetrician desire to adopt the method, a larger sized sterilizer can be readily made and special appliances may be inserted for holding the particular instruments used by him, as for instance, there is figured in the illustration a small tray for carrying such delicate instruments as the cataract knife, etc., so as to prevent their cutting edges from coming into contact with anything.

The sterilizer, which I have adopted for myself, is 7x12x12 inches, giving an air space of a little more than 1,000 cubic inches. The shelves are made of heavy, wide-meshed wire gauze, the upper one extending entirely across the chamber, while the lower two are only eight inches long, extending from the right side to an upright standard, four inches from the left wall, thus leaving a space four inches wide by eight inches high, which is reserved for the Schering lamp used in vaporizing the pastils.

In the report of our work we called attention to two features in the sterilization of instruments by this method, which we thought required further study. The first related to the question of the deposit of paraform on the instruments and the possibility of such a deposit retarding the healing of wounds. The second was the possible effect of the gas upon the cutting edge of the instruments.

I think we are able now to give positive answers to both problems. Since receiving my new apparatus I have repeated all the bacteriological experiments quoted before, and with the same results published. I have further exposed instruments to five and six successive sterilizations by the gas, without any washing or cleansing whatever, and at the end of the experiments I was not able by the naked eye to discover any deposit whatever, nor was there any taste of the gas when the instrument was applied to the tongue. A cataract knife so exposed was used in making a corneal section on a rabbit. Healing of the wound took place, as usual, when a sterile knife is used Blunt instruments so exposed and then applied to my own conjunctiva produced no irritation.

As to the question regarding the edges of the knives I tested very carefully their sharpness by means of the kid drum, both before and after sterilization, and I am not able to discover that the gas affects this in any way. To see whether or not the gas would affect instruments made of other material than steel I repeatedly exposed the following instruments to the action of the gas: knives with aluminum handles, knives with ivory handles, a hard rubber syringe, soft rubber catheters, a Politzer air bag, and a nickel-plated syringe. None of these objects were in any way affected by the gas.

My conclusions are then that we have in this method a rapid, cheap, easy and sure method of sterilizing instruments without in any way injuring them.—Bull. Johns Hopkins Hosp.

Annual meeting, Toronto, Canada, July 6, 7, 8, 1898.

Hot Air Treatment for Joints.*

By Frank E. Peckham, M. D.

It has long been known that heat was a valuable remedy in the treatment of various diseases, and it is a well established fact that dry air can be tolerated at a higher temperature than moist.

During the last two or three years various attempts have been made to construct a suitable apparatus for the proper application of this method of treatment and all kinds of affections have been baked in order to ascertain its value as a therapeutic agent.

The apparatus which I have been using consists of a cylindrical-shaped oven lined with asbestos, on the bottom of which rests a radiator for equally distributing the heat. Above the radiator swings a hammock upon which is placed the limb for the bath.

At one end various shaped sleeves are attached to take in or cover any part of the body. The other end of the oven is detachable, so that in case of overheating it can be quickly removed, thus instantly lowering the temperature.

There are, however, two dampers which regulate the heat so that this procedure would be rarely necessary.

In this oven wood alcohol is used to generate the heat which is carried in by means of a funnel.

In preparing a patient for the bath, the part to be treated is thoroughly covered by a double thickness of Turkish towel or blanket. This protects the skin from too intense heat radiation and also absorbs the moisture which collects on the skin due to profuse perspiration. In case of a foot being treated the toes and heel are most susceptible to the heat and have to be especially protected. When the heat is turned on the sensation of the patient must be the sole guide as to the temperature, always stopping short of any discomforts. If the heat causes pain the temperature must be quickly lowered by means of the dampers.

In my own cases I have continued the bath about one hour unless there was some special contraindication, and it can be kept at a fairly even temperature during the entire hour by a careful arrangement of the dampers.

So high a temperature cannot be obtained in the first bath as it is possible after two or three have been given, and there is a great difference as regards the degree of heat tolerated by different patients. In two of my own cases the temperature was uncomfortable above 200 degrees, while one young woman is perfectly comfortable with the arm in the oven above the elbow, at 410 degrees. I think most people would stand a temperature of 300 or 350 degrees.

At about twenty minute intervals the part is wiped thoroughly dry to avoid any possibility of a superficial burn.

The frequency with which the baths are given depends somewhat upon the patient, but more especially upon the disease. Generally speaking, in any acute and painful affection they should be given every day, or every other day, while in the chronic cases they should be given less frequently. This treatment has been used on about every disease imaginable, and slowly it is being found out that some affections are benefited and others are aggravated, and this cumulative experience will in time undoubtedly yield something definite.

In speaking of the diseases to be treated I shall attempt to show the value of the method as demonstrated by the various observers in this country, including my own personal experiences.

Sprains.—In acute sprains of joints hot air seems to be at its best. Kirby and O'Malley of Philadelphia have reported a number of sprains treated in this manner with uniformly good results. As you know, the treatment of sprains, particularly of the ankle, has been completely changed in the last few years, fixation with plaster-of-Paris giving way to friction and massage, and latterly excellent results were obtained by adhesive plaster, strapping and allowing the patient to walk. Dry heat is apparently another improvement. The ankle is subjected to the air bath, pushed to the tolerance of the patient. This should completely relieve all pain when a firm bandage of stockinet, or other suitable material, should be applied, thus giving support and enabling the patient to walk. In the cases with large effusion it might require from two to four daily baths to reduce it sufficiently to apply bandage and allow walking.

In chronic joint diseases it is not of so much value, yet it is being tried. Here so many have to be given that it causes loss of weight and strength. In rheumatoid arthritis the general opinion is that it is positively contraindicated.

I have used it in one such case. The disease was of several years' standing and, as usual, had progressively advanced under all kinds of treatment.

At the time the baths were begun there had been not more than two or three hours' sleep nightly for six months or more on account of the "grinding pain" which they all describe.

The knees were the particular joints giving the most trouble, the patient not being able to support the body weight on them and being confined to the lounge the day of the first bath.

The treatment was given evenings, and after the first one the patient slept beautifully all night and continued to do so for some time. Four or five weekly were given and for two

weeks there was a decided improvement, but after that the patient was perceptibly weakened, and at the end, although each bath would relieve pain for the time being, it would then return worse than ever. Twenty or thirty baths were given in all.

In acute articular rheumatism the result is excellent. A single case will illustrate. A young man of twenty-two was convalescing from typhoid fever when acute articular rheumatism began in both elbows and wrists. Medical treatment was given, at first including all of the usual remedies: sodii salicyl., salol, colchicum and kal. iod. The joints became much swollen, the pain was very severe, the weight of the arm lying on the bed being uncomfortable. Even opiates failed to give relief for any length of time and the young man was screaming with pain a good portion of the time.

At this stage of the disease things were getting serious and the use of hot air was begun. All other treatment was omitted. The left arm, which was the most painful, was put in the cylinder and in five minutes the patient was asleep, and during the hour I had to continually awaken him to know whether or not he was being burned. This was the first quiet sleep in over a week. The following day the other arm was "baked." In all, seven baths were given, when the joints were normal in size they could be freely used by the patient, and the disease which had been so intractable to medicine had vanished.

This method of treatment renders the joints very flexible, so there is not that tendency to contractures which is often troublesome.

In stiff and contracted joints, where bony ankylosis has not taken place, hot air is of great value. It softens up the adhesions and manipulations immediately after each bath gradually restore motion. (Case) A young woman had rheumatism in right arm ten years ago. The elbow and wrist were apparently involved. There was a dislocation of the wrist and the elbow was fixed at an angle of about 170 degrees. Twice ether was given and adhesions thoroughly broken up, but joints would stiffen up again immediately. Hot air baths were then begun and after thirty had been given, followed immediately by manipulation, flexion to nearly a right angle was possible. Average temperature in this case 375 degrees.

In open ulcerations, when due to infection, whether the bacillus of tuberculosis or any other kind, heat should kill the bacilli and so promote rapid healing.

Lumbago (Myalgia) should be immediately benefited by this treatment. It has also been of great value to me in the treatment of flat feet. The extreme heat renders the feet much more flexible and thus enables the patient to do the exercises better, and where the tendo achilles is contracted, as it is very apt to be, it can be forcibly stretched by the hands of the operator and without the use of a Schaffer shoe.

The intense heat thus applied to any localized region causes a profuse perspiration of the part inclosed. There is present a marked hyperæmia, the skin presenting a mottled appearance and the patients describe a feeling of numbness. There is also general perspiration. The temperature of the body is slightly elevated and the pulse and respiration somewhat increased.

As stated before, this treatment is being used for most everything, but in this way its value will be demonstrated. As rapidly as suitable cases present themselves I shall try its effect on tuberculous joints, especially those with openings, hoping that the heat may reach the bacilli within.—Atlantic Medical Weekly.

Scientific Splinting.

By Edward A. Tracy, M. D., Boston.

The splinting of broken bones dates back beyond the time of Hippocrates. Common sense indicated its use, tested it, found it good and set its seal of approval upon it. The object of such splinting was to keep the broken limb straight and to protect it from injury while it "knit." To-day experimental knowledge, gleaned from the kindred sciences of biology, pathology, histology and physiology, teaches that for the repair and regeneration of broken tissues rest is requisite—and that for the speedy and correct reunition of broken bones fixation is needful. This very principle of fixation for fractures is to-day in jeopardy because of a fallacious method of fracture treatment in vogue, especially in the hospitals. I refer to the plaster-of-Paris bandage treatment. Unmodified, a more unscientific treatment for fractures was never exploited. Fixation was sought for by its use, but the fixation gotten was most imperfect. The firmness of the bandage outside the limb was mistakenly taken to represent the condition within. Numberless deformities have been caused by this plaster treatment—deformities that would not exist had the Hippocratic old-fashioned splinting been used. Fixation with plaster-of-Paris bandages, applied in the ordinary way, is a fallacy. How could it be otherwise? With the limb swathed in cotton-batting, itself compressible, with the subsidence of swelling that accompanies fractures, with the tissue atrophy that comes with the non-use of the limb, how can one rationally expect fixation? Should we not expect deformities after such treatment? That such occur even in the practice of surgeons recog-

nized as skilful is not surprising. (See Burrill and Dwight's paper on the plaster-of-Paris treatment of compound fractures, published in the communications of the Massachusetts Medical Society, 1892.) The fact of non-fixation by plaster-of-Paris bandages ought to be universally recognized.

I have said that because of this fallacious plaster-of-Paris treatment the very principle of fixation for fractures was to-day in danger of being questioned. How else explain Championnière's attitude toward fixation, at the Moscow Congress? However, while modern science teaches that rest is necessary for the repair and regeneration of broken tissues, so long will fixation be deemed an essential of all fracture treatment. How can this fixation best be obtained? By a scientific surgical splinting. The requirements of a scientific splinting are, that splints be molded directly upon the parts treated, that they fit directly upon the skin without padding to destroy their immobilizing properties; that they permit of ready removal so that inspection of the parts may be easy; that they be resilient, and readily reapplied and readjusted to the limb, so that the subsidence of swelling and tissue atrophy do not impair their immobilization, and, finally, that they be permeable to the X-rays. Such a splinting is readily gotten by the practitioner intelligently using my wood-fibre splint material. Gummed felting, leather, gutta-percha can also be so used. My wood-fibre material is easily demonstrated superior to those materials, and is therefore advocated in preference to them; but any material that fulfils the requirements above given of a scientific splinting has my earnest advocacy. Plaster-of-Paris has not, except when used in the method advised by Roswell Park and Roberts—molding removal splints on the parts. Theirs is the only scientific way of using plaster-of-Paris. Such plaster splints, however, have not the lightness, the resiliency, the toughness, the cleanliness nor durability of molded wood-fibre splints.

To remind you of the adaptability of my wood-fibre to the various parts of the human frame, I present your four splint forms, with brief remarks upon each; (1) wrist splint, (2) humeral splints, (3) thumb splint, (4) rib splints.

(1) Splint for Wrist Fixation.—This splint form is applicable to wrist injuries and in particular for the treatment of Colles' fracture. It is made of wood-fibre splint material, molded over the dorsum of the forearm and hand in a semi-prone position, the hand in line with the forearm. It permits of an efficient treatment of Colles' fracture—that is, passive motion of the fingers from the first day, and, carefully, of the wrist from the fifth day. The splint is discarded generally on the twenty-first day. The efficiency of this treatment I have demonstrated, and am pleased to find that one text-book, Moullin's (edited by J. B. Hamilton), advocates it, Moullin's conclusions on the efficiency of the treatment being independent of my own. The splint form, however, is original. Such a splint compares favorably with the elaborate fencing and staging which we frequently see surrounding the arms of hospital patients perambulating Boston's streets. If such patients or the hospitals derived an income by letting space for advertising purposes on this constructional arm splinting, its use nowadays would be more comprehendible.

(2) Humeral Splints.—These are molded upon the arm, and follow the directions given by Hamilton for molding similar splints for fracture of the surgical neck of the humerus from leather. Hamilton taught and practiced scientific splinting, and was ever averse to the use of plaster-of-Paris.

(3) Thumb Splint.—This is readily made by cutting a piece of my splint material and molding it so as to inclose the thumb, the back of the hand and a portion of the palm, avoiding the cross-palm lines. It forms an efficient thumb splint. Its description was published in the Boston Medical and Surgical Journal April 12, 1894. I venture to bring it to your notice again, as I see by an article in the same journal since, one of our hospitals has been struggling with a tin thumb splint. The age of tin splints is passed. The fact that tin is not permeable to X-rays condemns its use for such purposes, as to-day we desire to know the position of bones through the splinting, not caring to depend upon a guess as to their condition.

(4) Rib Splint.—This splint is a very simple one and readily constructed. It should be molded over the injured side of the chest from an appropriately shaped splint blank, and bandaged thereon with a swathe. This treatment for the ordinary case of fractured ribs seems a rational one. I do not understand how adhesive plaster or a simple swathe can protect the broken bones from external pressure that may occur at any time, and particularly when the patient sleeps. The rib splint, however, spanning the weakness in the chest wall and resting on the secure foundation of the sound ribs, prevents undue pressure from reaching the point of fracture.—Bost. M. and S. Jour.

Practical Method of Removing Plaster-of-Paris Dressing.

By J. Torrance Rugh, M. D.

In a paper published in the Philadelphia Polyclinic of April 25, 1896, I briefly considered the length of time a plaster-of-Paris dressing should remain on a patient, show-

ing the impropriety, and sometimes the positive harmfulness, of failure to remove the dressing at the proper time. To the general practitioner, or to any one who has but little to do with plaster-of-Paris dressings, and consequently has none of the more improved instruments for cutting them, the question of how to remove them becomes of almost as great importance as when to remove them. With the hope that a few readers may be benefited by a short review of the subject, I shall mention some of the methods more frequently employed and more practical.

The statement might be made that any one can take off a plaster bandage, and it would not be amiss, but in so doing, many may do untold injury to the part or parts involved, and entirely undo all that has been accomplished by the rigid dressing, and besides cause the patient much unnecessary pain and discomfort. As in all other things, there are proper and improper ways of removing these bandages, and he who can properly cut and take off one will frequently find his knowledge of inestimable value to himself as well as to his patient.

Before attempting removal, two questions must be answered as affecting the manner of cutting the splint: Is the splint to be reapplied, or is it no longer useful, and hence to be thrown away? If to be replaced, much more care must be observed in cutting it than if it is to be discarded, for, when reapplied, it must fit as accurately and closely as before removal, and its rigid character must be preserved, else its efficiency is much interfered with. There must also be no rough and uneven edges to irritate or pinch the skin after the firm retaining and fixing bandage or cloth has been applied.

Having decided as to the final disposition of the plaster dressing, one marks with a pencil the direction in which the cut is to be made. If the dressing is about the waist, and is to be thrown away, the best line for cutting is along the side, but if to be reapplied, then along the front or on the nipple line. If on the leg or arm, the front cut is the better for either purpose, as in the former case, the lateral diameter of the foot is much less than the antero-posterior, and consequently the bandage must be separated much less in order to remove it. For cutting neatly and safely through a plaster bandage, there is nothing better than a small saw curved on the cutting edge. The preferable forms are known as the Hunter or Sherman saws, of which the blade is about five inches long and one and a half broad, and with the teeth so placed as to cut by drawing the blade toward the operator. The teeth should be of medium size, as, when fine, they clog too easily, and when coarse they do not cut the cotton mesh of the dressing readily, and the saw is very hard to start. Also a saw should be short, and the curve at the point should be quite sharp, so that in cutting over a hollow part, as in front of the ankle, the plaster can be cut through evenly at all points, and in such a position a rocking motion of the saw will cut most rapidly and satisfactorily. The tooth edge should extend from the handle to the point of the blade, giving as long a cutting edge as possible, so that when the bandage is on a flat surface the cutting can be done more rapidly; then, too, if the cutting edge is long, the blade must be broader to give the necessary support and strength, hence it will be more rigid, which is a quality of efficiency.

In using the saw, long strokes should be employed until about through the plaster, then short ones until finished, as the splint is seldom of a uniform thickness, and if it is being cut rapidly, the saw may slip suddenly through the remaining layer of plaster and the protective, and scratch or cut the skin.

Various patterns of rotary saws have been used, but have not proven satisfactory, especially with a bandage of any thickness. An ordinary hand saw may very well be used in those cases in which the surface of the part to which the plaster is applied is quite flat or even; sometimes, also, the cutting can be begun with this and finished with a pair of short-bladed scissors or a knife.

Next to the saw, probably the most frequently employed instrument is a heavy scissors, but as a rule it is unsatisfactory. Many different forms have been devised so as to combine leverage with cutting power, and all but one have been discarded as useless, except in quite thin and soft dressings. This one, however, known as Reed's plaster-of-Paris cutter, is really very serviceable, and will cut plaster of any thickness that can be crowded between its blades and of any degree of hardness. It has one broad, solid blade, almost U-shaped, having the handle attached at the top, and having the cutting edge below, with several saw teeth at the anterior end of this edge. The cutting edge is curved from behind forward, and fits closely to the other blade, which is somewhat L-shaped. The upright of this blade, which springs from the handle, is broad and flat, giving great strength, and the horizontal portion tapers to a probe point, and has the cutting edge slightly concave. When the broad blade passes the other, there is a double motion, direct crossing and sliding of the edges on one another, which enables the blades to cut through the densest plaster. To cut with them the narrow blade is inserted under the plaster, the handles are brought together, and the whole instrument is then tilted upward and forward; the teeth catch in the plaster, and the lower or narrow blade is drawn upward through the cut just made, and this cut so

enlarged that the blade can again be pushed forward and the process repeated. The leverage is powerful because of the short cutting edge and the manner of uniting the two blades, the rivet being placed well forward and above the edge, which last is about two inches below the line of the handles

If the plaster is thin or has been softened, by some means to be mentioned later, a strong pair of scissors with short blades will ofttimes suffice for removal. Probably one of the most generally serviceable instruments, however, for regular use, or in emergencies is a strong, sharp knife with a hard temper, which when used to cut obliquely is most efficient. I am indebted to Dr. John Ridlon of Chicago for this idea, which is truly excellent. A New York firm (J. Curley & Bro., No. 6 Warren street) makes a knife especially for this purpose, but it usually happens that when needed the knife is not at hand. A short time ago I went to the country to operate upon a tuberculous knee, and found a heavy plaster-of-Paris dressing on the entire leg. I had, of course, forgotten the plaster saw, but the family had a shoe knife, which, fortunately, besides being strong and hard, was sharp, and with it I very quickly and easily removed the dressing, cutting obliquely and drawing the upper part away as it was cut through. When done in this manner, there is no danger of injury to the patient, as the part to be cut is constantly exposed. Of course, this breaks and destroys the dressing, rendering it unfit for further use. If it is to be reapplied, a solvent such as dilute nitric or acetic acid, or strong potash, or ammonia, may be run in a line down the splint with a dropper, and it can then be readily cut with an ordinary knife. Strong vinegar will answer if the stronger chemicals are not at hand, and usually proves very satisfactory.

A mallet and chisel have been used to cut off a plaster bandage, but their use must necessarily be accompanied by more or less jarring, and, in many cases, pain to the patient, hence they are not to be recommended where much more satisfactory means are at hand. One other method remains to be mentioned in this class. When the bandage is being put on, a stout string is put underneath in the line along which the opening is to be made. When ready to be removed, a strong wire which has been nicked at several places is attached to the string and drawn through under the plaster. The wire is then sawed back and forth, and the plaster cut through as by a chain saw. When a plaster dressing is being applied, various devices may be incorporated which will favor removal. One of these is to place stout but thin steel wires between each layer of bandage, one over the other, leaving the ends out. When ready to remove the splint, one pulls up each wire separately, beginning with the top one, and the plaster will be torn through. Another method ofttimes employed, is to place a V-shaped piece of zinc or tin upon the lint or cotton protective and apply the plaster over this. When ready to cut the splint a rasp or coarse file is used over the ridge made by the tin or zinc, and the desired end is soon accomplished.

By using a solvent as above indicated, a plaster dressing can be cut by almost any instrument, and what at first may appear to be a very difficult matter, finally becomes quite easy.

Finally, the bandage may be cut through directly after it has been applied and before it is quite hard. A strip of tin (metal) or lead is first laid over the part, and the plaster applied over this. Then before the hardening process is complete, the dressing is cut by a knife, over the metal strip, after which the strip is drawn out. There is thus no danger of cutting the patient, and the cast can be removed whenever occasion demands, by simply cutting the protective with scissors and spreading the splint. By doing this carefully the exposed part can be thoroughly examined and if necessary lifted out of the cast and again replaced. In case the plaster is again reapplied, it must be bandaged firmly or held by strips of adhesive plaster after it has become thoroughly dried. This is a most satisfactory method in cases in which there will be but little strain upon the cast after it has set, but the dressing is not so rigid and stable as when uncut. If the cut edges of a plaster are rough, or it is to be worn for a long time, they should be bound with adhesive plaster or with some similar material or with fresh plaster-of-Paris bandage. When the skin is properly protected by lint, cotton, or such, there is little or no danger of cutting it with the saw, as the sensation of cutting plaster is so different from that of cutting cloth that one readily recognizes the fact that the saw is through the bandage. But if the part is unprotected, and this should but rarely occur, removal without cutting or scratching the skin is almost impossible even by the most careful and expert operator. In these cases, the risk of cutting the skin may be overcome by passing a case knife or spatula, or a strip of zinc underneath the plaster and cutting upon that.—Philadelphia Polyclinic.

Traumatic Hæmorrhage Into the White Brain-Substance Cured by Surgical Interference.

Borsuk and Wizel report a case of hæmorrhage into the white substance of the brain, followed by aphasia, hemiparesis and Jacksonian epilepsy, which was cured by surgical interference.

After the removal of a clot from the dura and the relief of acute symptoms, the patient had repeated attacks of Jacksonian epilepsy. The reopened wound showed nothing abnormal, but a long hypodermatic needle passed deeply into the brain-substance drew out a blood-stained fluid. The dura was then incised, the needle again passed, and at the points from which the blood-stained fluid was withdrawn a deep incision was made down to the white substance. Bloody fluid and blood-stained contused white matter were removed; a strip of iodoform gauze was inserted, and the wound sutured about it. The strip of gauze was removed twelve days after the operation, and with it about a teaspoonful of blood-stained fluid. The wound then closed and the patient made a complete recovery.

This observation leads to the following conclusions:

(1) Extravasations of blood of traumatic origin can be removed from the brain-substance by surgical methods, as well as contused and destroyed brain-substance, and in the same manner pathological and circumscribed portions of brain-matter.

(2) It is possible that extravasations of blood other than those of traumatic origin may be removed by surgical interference.

(3) The brain does not resent surgical procedures more than any other part of the body. —Bost. M. and S. Jour.

Personal.

Our associate, Dr. W. A. McCandless of St. Louis, was elected first vice-president of the Missouri State Medical Association, at its recent meeting.

The other officers elected were:

President—George R. Highsmith, Carrollton.

Second vice president—C. F. Wainright, Kansas City.

Third vice president—W. S. Allee.

Fourth vice president—W. A. Brummell, Salisbury.

Fifth vice president—W. E. Lucas, Mendon.

Recording secretary—A. F. Dresel, Sedalia.

Assistant recording secretary—B. C. Hyde, Kansas City.

Treasurer—U. S. Wright, Fayette.

Corresponding secretary—E. Van Note, Hamilton.

Dr. Henry F. Hoyt, who has been nominated by the United States senate for the position of chief surgeon of the volunteer army, with the rank of major, was born in St. Paul forty-five years ago. He is a son of Lorenzo Hoyt, a pioneer settler, who came to St. Paul in 1848.

The early education of Dr. Hoyt was received in the district schools of Ramsey county. He afterward attended the state university, and later began the preparation for the practice of medicine, which has placed him high in his profession He attended the Rush Medical College, at Chicago, and graduated from Columbus Medical College in 1882.

After receiving his degree Dr. Hoyt located in Mexico, where he practiced five years, gaining through this experience, also in New Mexico and Texas, a knowledge of tropical diseases, which well qualifies him for the position which he will fill with the army in the present war. During this time Dr. Hoyt became a fluent Spanish linguist, an accomplishment which will also aid him in the position of chief surgeon.

Dr. Hoyt located in St. Paul and was health commissioner here for nine years. Eight years of this time he was assistant chief surgeon for the Great Northern, and the Chicago, Burlington & Northern railroad companies. He is at present chief of surgeons of these roads, having under his care some 15,000 persons.

As an indication of the position occupied in the medical profession by Dr. Hoyt, he is a member of the American Health Association, International Association of Railway Surgeons, Minnesota State Medical Society, Ramsey County Medical Society, of the governing board of surgeons' staff of St. Joseph's Hospital, and of the St. Paul pension board. —St. Paul, Minn., Daily Globe, May 22.

Dr. A. I. Bouffleur has been appointed assistant professor of surgery in Rush Medical College, Chicago.

Commencing with May 1, the Union Pacific railroad will maintain a surgical department only. It will furnish free surgical treatment at home, in hospital, or otherwise, to all employes who are injured while performing their duties to the company. The old assessment plan of assessing each employe 40 cents monthly for maintaining the medical and surgical department was discontinued February 1. The company will not hereafter treat medical cases.—West. Med. Rev.

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OPEN TREATMENT OR WET DRESSINGS FOR WOUNDS.*

BY E. E. BARRETT, M. D., GLENCOE, MINN.

Modern surgery of to-day is an art and a science and in stride has kept abreast of the leading sciences of the time. To fully appreciate the triumphs of modern surgery we have only to glance at a few changes that have been wrought in mortality rates from operation and wounds during the last few years.

Gerster states that "80 per cent of all wounds treated in Nussbaum's clinic in Munich were attacked by hospital gangrene."

Within one year 11 out of 17 patients subjected to amputation died of pyemia. In Volkmann's clinic at Halle the usual rate of mortality in compound fractures was 40 per cent. In America no better conditions prevailed. Ashhurst in 1881 boasts of a mortality rate of only 28 per cent after 100 major operations, when the usual rate was 33 per cent.

The published reports of the Pennsylvania Hospital, from 1831 to 1851, where the death rate reached 44 per cent in 116 cases, or of the New York Hospital during the same period, where the rate was 48 per cent in 126 cases, are fair examples of the state of surgery half a century ago.

These instances we may contrast with the report of Dennis under the antiseptic regime, comprising 1,000 cases of compound fracture treated by him in the hospitals of New York, covering a period of several years, with a death rate of 1-7 of 1 per cent. Many others as favorable, or nearly so, could be cited, but this will suffice for our purpose.

Under such a showing is it not important to bear in mind that surgery of the present day is a science of wonderful possibilities and achievements, and unless we are thoroughly versed in its mysteries it would be better to seek a vocation outside its domain.

We know at the present day that this great improvement in mortality rates is not due in great measure to greater dexterity in the hand of the surgeon, but to a better knowledge of the causes that produced those unfavorable results. We know that if we protect our wounds from organisms that produce these unfavorable results they will heal kindly and quickly, in summer or in winter, in hospitals or the humblest cottage, in the old or in the young. It is important then to study the best method of protecting our wounds against the invasion of these organisms.

The treatment of simple incised, non-infected or operation wounds is too well established to be a subject of discussion at this time. The class of cases that most interest us as railway surgeons are contused and lacerated wounds. I would not say that all contused and lacerated wounds are infected, but we can safely say that all contused and lacerated wounds are either infected or present conditions so favorable to the production of pyogenic and putrefactive organisms that it is difficult to maintain asepsis. Nearly all lacerated and contused wounds could readily be made clean by the free use of the knife, and although it is the first great duty of all disciples of Hippocrates to fight death, to save life, at the same time we must not lose sight of that other more modern view of the art of healing. To save every member or part of a member that may be useful in after life whenever the attempt at preservation will not cause greater danger to the life of the patient than there is probability of saving the limber member.

In lacerated and contused wounds the condition of the wound itself is favorable to the production of bacterial growth, as nearly all such wounds contain tissue so bruised or

* Read at the fifth annual meeting C. M. & St. P. Railway Surgeons.

separated from normal tissue as to cause death of some portion, and it is evident that the presence of necrotic tissue in a wound is a favorable condition for infection. Hence the first indication, in such wounds, is to apply such means as are best calculated to prevent the development of bacterial growth. It is not only important that certain agents whose antiseptic or inhibitory action is well known should be applied to the external surface of wounds, but they should be brought in as intimate contact as possible with every part of the wound.

The most reliable agents are boric acid, creolin, lysol and bichloride of mercury. Bichloride of mercury still stands at the head as the most active and efficient germicide, but is objectionable in many cases where the contusion involves considerable tissue on account of the danger of absorption, and, as claimed by some, on account of the deleterious effect upon the vitality of tender tissue. Creolin appears to possess excellent antiseptic and stimulating properties, but is objectionable on account of its odor.

So that it seems to me that our device in many cases of severe contusion, covering considerable surface of the body, must lie between boric acid, either in the form of the boroglyceride or a concentrated solution of the crystals or lysol in the strength of ½ of 1 to 1 per cent solutions.

The second indication is to prevent absorption of fluids by free drainage and by furnishing a solvent for carrying off all deleterious matter. This want is best supplied by use of warm water, either by the submersion plan, by irrigation or by the method which is more convenient in most cases, by the application of dressings saturated with one of the above named antiseptic or inhibitory agents. Gauze is the most universally employed for these dressings, and I believe fulfills all indications. We must be guided in the selection of our antiseptic by the size, condition as regards sepsis and character of the wound. In wounds involving little area undoubtedly mercury bichloride is the safest and best, especially if strong reasons exist for suspecting sepsis. If, on the other hand, large areas of the surface of the body are involved, and the wound is not seriously infected, lysol solution or solution of boric acid are the agents best adapted to the case, and I regret that my experience has been so limited with their use that I cannot speak more fully upon the subject, but I hope in the discussion of this paper the subject will be dwelt upon more fully.

I desire to call your attention to the following cases before closing:

Case 1. In January, 1897, was called to attend a young man suffering with a lacerated wound of the left hand, produced by the explosion of a gun barrel from overloading. The last phalanges of both the third and fourth finger were blown away, both fingers badly lacerated; the fourth metacarpal bone of the hand badly shattered, leaving a large ragged opening through the palm. The thumb was almost completely severed from the hand, only the skin on the posterior aspect remaining. The metacarpal bone dislocated from the carpus, I advised immediate amputation of the thumb and forefinger, but the patient and his friends would have none of it. The thumb must be preserved intact. It being the choice to dress the hand as it was, or resign the case, I concluded to do the former and watch the case. The hand was dressed in warm bichloride gauze and directed to be kept wet. I saw the case every day for three or four days; at the end of that time the thumb was in an active necrotic condition, but the forefinger presented a bright, healthy appearance. The thumb was removed, the skin from the posterior surface being utilized to cover the opening. This flap afterward sloughed, leaving a granulating surface, which slowly healed, without any infection or other untoward results.

Case 2. Was called in the middle of the night to attend a man injured by a mower and found the left foot nearly severed from the body about three inches above the ankle. Both bones were severed, the knives having cut away about one and a half inches from the shaft of each bone; the arteries were sound. except, possibly, the anterior tibial, which could not be found. The hæmorrhage had been very severe. The foot was cold, the surroundings unfavorable. After a consultation it was deemed best to amputate. The amputation was made at a little below the middle of the leg by the modified circular flap operation, drainage tube inserted and the

wound closed and dressed with dry antiseptic dressing. I did not see the case again till 36 hours after the operation. The stump was found to be distended with bloody fluid and the skin flap on the outside of the leg blistered and livid in appearance. The stump was irrigated and dressings applied as before. By the next day a considerable portion of the external flap showed positive signs of sloughing. The temperature was 101 degrees, the stump painful and the patient restless. After washing the wound externally with bichloride solution the stump was flushed with peroxide of hydrogen, all stitches removed, the skin flaps turned back and irrigated with 1 per cent creolin solution, the stump packed with gauze wet in the same solution. This treatment was kept up till August 2—about two weeks—when nearly all the external flap had sloughed away. The wound surface was healthy, and, the slough having separated, by a little ingenuity the posterior and internal part of the skin flap were coapted and again sutured and the wound was nearly all healed in ten or twelve days.

To recapitulate the chief indications for treatment in contused and lacerated wounds are:

1st. To prevent bacterial growth. 2d. To stimulate the vitality of the parts. 3d. To hasten separation of necrotic tissues. 4th. To gain time before resorting to amputation. The most powerful means we have of controlling these conditions are by the use of moist antiseptic application, either by complete submersion in mild antiseptic warm water, using lysol solution or concentrated boric solution or by constant irrigation with the same means, or in milder cases by moist dressings of saturated gauze. In all cases where the surface for absorption is not too great and in cases where infection has taken place, bichloride solution still holds its place as the best anchor of our hopes.

This paper may contain nothing new, possibly no one will be benefited by it, but I have derived some benefit from writing it, and trust it will do some good. I remember when in school a teacher used to make us review the multiplication tables long years after we learned them. I don't think it did anyone any harm.

MOIST DRESSINGS IN CRUSHING INJURIES.*

By Charles A. Armstrong, M. D., Boscobel, Wis.

Crushing injuries occur in many varied forms, affecting all parts of the human body, making it necessary to select some particular form, or class, for discussion. In this article injuries of this character will be considered as affecting the extremities. The hand, owing to its varied functions, is injured more often that the foot. Indeed, on a majority of the divisions constituting the great St. Paul system, injuries to the hand are the only ones seen by the local surgeons.

Closely associated with the crushing injuries made by the draft-iron are those caused by the cog-wheels of machinery, by fire-arms and by the unexpected falling of heavy bodies, the tissues in each case presenting almost the same appearance.

The fingers and toes seem ever present to demonstrate that two bodies of equal density cannot occupy the same space at the same time without material injury to one or both of them.

Our position as surgeons gives us a fine opportunity to prove that apparently devitalized tissue in a lacerated hand may be restored to usefulness by careful nursing.

As remarked at our last meeting by Dr. W. B. Johnson, "Everything considered, I believe that, in the hand, where every inch is so valuable, we should always take advantage of the doubt, if it exists, and a reasonable amount of waiting and moist dressings will often bring forth wonderfully satisfactory results, although requiring more work and care on the part of the attendant."

The practitioner who establishes a reputation for saving every particle, though a trifle disfigured when recovery takes place, will be as well thought of by the railroad men of his division as the great surgeon, who takes no chances, but trims to the line, that union by first intention may take place.

Last spring a brakeman crushed the index finger of his left hand so badly that in remov-

*Read at the fifth annual meeting of the C. M. & St. P. Railway Surgeons' Association, at Chicago, October 28 and 29, 1897.

ing his glove the tendon had to be cut to free the finger, bringing the finger off with the glove. The second and third fingers were badly crushed; the surgeon called advised amputation; the patient objected; the hand was put in a dry dressing and the case transferred to me, as I was nearer to the home of the brakeman, where he intended to stop. A moist dressing was put on, as the tissues looked badly nourished; daily dressings continued for several days, the parts were restored to the extend of almost perfect motion of both fingers.

Another case where the third finger was crushed very badly it was thought best to remove it, owing to the intense hot weather and danger of infection of the other parts of the hand nearly as badly injured. The patient protested, assuming all responsibility, and we patiently cared for the hand for a long time with quite good results.

To be conservative is very proper, yet to be too much so is liable to produce a result entirely unexpected.

Railroad men get the idea that because in some cases which they take to be similar to their own, a good result was obtained in a doubtful condition, that their case will result the same way. In such cases it is but fair to explain the exact conditions surrounding their injury, allowing them to take the responsibility of unfortunate results if any follow. At such times the surgeon must have witnesses present, who comprehend the situation and can, if trouble arises, state the facts in his favor.

The antiseptic dressing has had a great deal to do with making conservatives. The prime factor in adopting a conservative course lies in the hope that our efforts will be appreciated. Without this feeling it is hard to adopt a method incurring at times great risks on the part of the attendant. To dress a finger daily for three or four weeks to save it has little to recommend it, when we know a radical operation will complete the case in half the time. This is especially noticeable when our contract does not call for much pay in minor operations.

Yet, a favorable termination of a protracted case does pay if we consider the happy condition of mind enjoyed by the patient and duly appreciate the mild form of advertisement furnished to us in a way that is not under the ban of the Code of Ethics.

In a case presented for treatment showing much damage to the parts the cleaning of the hand is very difficult, handicapped as we are often by much grease and dirt. Johnson's ethereal antiseptic soap, used with an abundance of boiled water, has, with me, been productive of the best results. Following this borolyptol and water, equal parts, to irrigate the wound, has been a matter of routine practice. The use of whisky or brandy with strychnia to overcome shock, and act as an anæsthetic, has in nearly all operations on the extremities rendered other anæsthesia unnecessary. With the wound as clean as possible, the hæmorrhage controlled as far as can be, and such parts as is absolutely necessary removed, we pack the hand in sublimated gauze, covering with absorbent cotton and roller bandage. Then a perforated tin splint is adjusted, extending far enough beyond the tips of the fingers to avoid danger from bumping the hand. Thoroughly wetting the dressings with borolyptol one part, water three parts, the hand is elevated very high and the patient put to bed.

The moist dressing will in from one to four days demonstrate its efficiency. I never leave it on longer than the time necessary to show returned vitality, termination of swelling and stopping of oozing. The swelling does not increase as fast under the moist dressing and the presence of fever is not so manifest.

The first redressing is the one most calculated to try the patience of the surgeon and cause the patient to appreciate the extent of his injuries. In moist dressings it is a difficult thing sometimes to get the gauze off the crushed tissues, but in a dry dressing the matter assumes greater proportions and the quality of glue formed compels the use of too much water, if you have any thought of the patient in trying to coax it loose without the use of water. In an infected wound the moist dressing is more soothing than the dry and the spread of the infection does not seem to be any more rapid. In perforating wounds lacerating the palm you can afford to wait to see the effect before amputating if there is any hopes of saving the hand.

A boy attempting to draw a gun from un-

der the bed by taking hold over the muzzle discharged the piece, the whole charge passing through the hand just anterior to the palmar arch. The packing of the wound with moist gauze and covering with water dressing advanced the healing process a great deal without any lateral infection.

In a penetrating wound of the palm, caused by a Deering twine binder needle passing through the hand nearly nine inches between the third and fourth metacarpal bones, the palmar arch escaping injury, the moist dressing greatly retarded the swelling, and there was no rise in temperature after the first forty-eight hours. As soon as the period of moist dressing is over it is my custom to put on very little water in dressing, drying the parts with absorbent cotton and covering the wound with anazyme powder. Outside of this the sublimated gauze is used with absorbent cotton to protect the parts, and the use of a splint for the hand during all the time of treatment.

The railroad men ask you to save all you can; this you are in duty bound to do, yet we should not be too expectant unless the patient is willing to assume his share of the responsibility. So that in protecting ourselves we protect the interests of our employers, at the same time laboring to do the best by the patient possible.

Extreme elevation in wounds of the extremities is necessary, this being best accomplished by putting the patient to bed.

Not wishing to force the subject of moist dressings in crushing injuries too strongly upon the members of the association, we close our remarks by saying that, though our coming here with ideas very old may seem a presumption, yet we hope the ideas presented in this, our annual school of instruction, will provoke discussions that will the better qualify us, on our return home, to more skillfully attend to the needs of our fellow men.

DISCUSSION OF BOTH PAPERS.

Dr. F. R. Garlock, Racine, Wis.: I like dry dressing pretty well. I think I have seen moist dressings have a tendency to favor infection. It is liable to set up whenever we use it, whereas in the dry dressings, if there is a possibility to have a union by first intention of the wound, we will get it.

Dr. R. A. Cushman, Sanborn, Ia.: I like the dry dressings best. I was called to a man who had cut his arm very badly. I washed it, using quite warm water. After I had trimmed it I dusted it with boric acid powder; then I put on borated gauze and put on a bandage. I told him that the chances were that the flap would slough out. On the contrary, it is going to heal in; it looks good.

Dr. S. E. Robinson, West Union, Ia.: One week ago last Friday I had a man slip his hand under the cylinder of a thrashing machine and he had gotten it clear into the machine, so that the teeth of the cylinder had lacerated his fingers and the back of his hand. The ring finger of his right hand was cut down into the joint. I dressed him somewhat as to the latter, only I used acetanilid. He came back to me day before yesterday and I had not removed the dressing and nothing had been done to it; then I removed the dressing—the first dressing was put on a week ago last Friday—and when I removed it there was a little particle of pus in that one wound; the rest of the wounds were all perfectly healthy and I wrapped them up with a fresh dressing and told him he didn't need to come back any more.

Dr. J. Binnie, Poynette, Wis.: In regard to moist dressing and dry dressing, everything depends on the conditions. Dr. Garlock was correct when he stated that it lacerated the tissues, and the writer was correct—that it brings back vitality to the ragged edge at other times. I am in favor of the moist warm dressing and keep the parts for one to three or four days. If it is a deep wound and the walls of it are heavy and massive and thick, you may get along very well with your dry dressing. Under diverse conditions diverse methods should be employed, and there are conditions that demand both kinds of treatment. We have to apply our common sense as to which is the proper wound for the moist dressing. I prefer the moist dressing wherever I have a badly lacerated tissue.

Dr. J. F. H. Sugg, Clinton, Ia.: The last speaker has stated that it is the conditions that determine the kind of dressing we are to apply. If I understand it, in the lacerated tissue they are referring to cases where the vitality is at the minimum and the object of applying the moist dressing is to save the vital-

ity of the part. If it is a question of getting union by first intention, in that case we might recommend the dry dressing, because the circulation, the vitality of the part must be good if we anticipate union by first intention. The gentleman who spoke of the injury to the back of the hand, the vitality of the hand was not materially injured, the blood supply, and his dry dressing proved effectual. But if the injured parts were blanched and cold and it was absolutely impossible to save them, his dry dressing, in my opinion, would have been a failure. The moist dressing would have given the only possible chance for life.

I certainly agree with the essayists upon this subject, as I think they understand the subject and the treatment. Where the question is not one of union, but of saving the vitality of the part, on account of impaired circulation, I think the moist dressing should be used. There is only one criticism upon the last essayist, and this is not a just criticism, but I thought he spoke of splinting. When he did that and mention the position of the part before he applied the dressing, that part should be elevated. The question as to what we will use, whether bichloride of mercury or carbolic acid, after we have rendered the part as nearly aseptic as we can, I am in favor rather of carbolic acid instead of bichloride of mercury, and then I have found nothing that gave me better results than a good saturated hot solution of boric acid.

Dr. Barrett, in closing discussion on his paper: This subject, of course, from the limited experience I have had, and also from what I have been able to read, leads me to believe that my views are correct, and I did not want anybody to misinterpret or misunderstand the tenor of my paper. I believe dry dressings should be used where it is possible to clean the wound and get it in an aseptic condition at the time, without the destruction of any tissue that would not injure the utility or use of the part. In my paper I mention the condition of the sloughing stump. It was due to the condition of the man. Certainly I did not give that man as an illustration of skill on my part. It was simply the man had a temperature, one side of the stump was sloughing and something had to be done to relieve that. I cleansed the wound with an antiseptic solution. I have no doubt the man would have got along with the other. I used Müller's solution under those sloughing flaps and think the flesh stump would certainly produce infection in a short time unless it were protected. I believe I was right in doing it.

Dr. Armstrong, closing discussion on his paper: The point that I wished most forcibly to present was the one that the doctor spoke about concerning devitalized tissue by a dry dressing. The method is certainly good, but if we can do it with the moist dressing and produce the same result by two different means, I think that, as has been said, that the tool that we were best acquainted with would be the one we ought to use. The circumstances that surround the case would have a great deal to do with it, and yet I feel that injuries which are confined to the hand, the subject taken up by the paper, that it is better to put on moist dressing for 24 hours than it is to clip off parts that seem to be dead in order to close it up and make a dry dressing of it. I think that the dry dressing hinders the return of vitality to crushed parts; that is, pieces of tissue that still adhere. In that way I think the condition is bettered by the moist dressing. However, as stated, this is our school of instruction and the best place to receive the censure or commendation of older men in the profession, that we, the younger men, may hope to follow successfully in their footsteps.

REPORT OF A CASE OF TRAUMATIC PERITONITIS.*

By Emery H. Bayley, B. L., M. D., of Lake City, Minn.

On August 22, 1897, I was called to see H. H., a German, aged 22 years, who had been feeding on a thrashing machine. The jar of the machine and contusion produced by bringing the abdomen against the feed-board, together with his becoming excessively hot and drinking cold water, had, three days previously, produced frequent discharges and acute abdominal pain.

At time of first visit I found temperature 102 degrees, pulse 100, acute pain, general peritonitis and marked tympanites.

*Read before the fifth annual meeting C. M. & St. P. Railway Surgeons.

Treatment—Morphine gr. ½ to gr. 1-7, with atropia sulph. as needed to relieve pain, turpentine stupes to abdomen, nourishment, milk with lime water and liquid beef peptonoids every three hours. Later whisky and tincture digitalis as stimulant. Turpentine emulsion and Fraser's antifirmentative tablets to relieve accumulation of gas.

The case seemed to do fairly well for six days up to August 28, at which time there was a bowel movement. The pain became much more acute and the abdominal distension enormous. Tried turpentine emulsion by mouth, turpentine, saline, glycerine injections and rectal tube to no avail.

On August 30 pulse 135, respiration 55, temperature 101.5. The abdomen enormously distended. I concluded to pass two small pleural aspirating needles into the intestines, in the median line, two and four inches below the umbilicus, which I left in for 48 hours; every 12 hours I attached the aspirator to clear out the needles. The gas which escaped through the needles was very offensive.

At the end of 48 hours I removed these needles and inserted two smaller needles, one at a time, into the transverse and descending colon. In all eight needle punctures were made. The needles remained in for five days; by that time the gaseous distension had greatly diminished and a bowel movement followed an injection.

The fever ranged from 102 to 99, and continued until September 18—in all, 26 days. The abdomen for a number of days seemed boggy. Finally the bogginess and fever disappeared and the young man made a good recovery.

I believe the needles relieved the gaseous distension, thus permitting him to live until the inflammation subsided. No bad effects seemed to result from the use of the needles.

DISCUSSION.

Dr. W. T. Sarles, Sparta, Wis.: I just want to inquire if the doctor got hold of a copy of the Veterinary Surgeon for 1865? Of course that has been practiced in veterinary surgery for a number of years. I should imagine unless he protected the exit of those needles with antiseptic gauze he might do as much harm as he would good.

Dr. J. F. H. Sugg, Clinton, Ia.: One swallow never made a summer. I would certainly be very loath to follow this practice, and do not believe it is warranted in the ordinary cases of peritonitis.

Dr. F. R. Garlock, Racine, Wis.: While I do not think it would be safe practice for us all to follow, yet possibly by a single operation we might remove the gas, though really I cannot believe until the disease had run its course. I think it was more tympanites than peritonitis. I had the case of a lady who was thrown from a carriage and she immediately assumed all the condition that he speaks of; the abdomen was enormously distended, but on treatment the distension gradually subsided. That case I did not consider as a case of peritonitis; it was simply a case of stoppage of the bowels.

Dr. C. A. Spillman, Ottumwa, Ia.: This case strikes me as being peculiar in the cause alleged for this inflammatory condition. The question comes up in my mind, how do we know that this bruising of the abdomen, this drinking of water, caused this peritonitis? Is it not probable that it may have been appendicitis or an accumulation of fecal matter, and after all was it due to different causes from those alleged? If so, why did not that run its course and the case recover without this surgical procedure or with some other surgical procedure more quickly applied or applied sooner. It seems to me like it is rather obscure in its causation.

Dr. E. E. Barrett, Glencoe, Minn.: I would like to have some one speak of the appropriate treatment for traumatic peritonitis. I have been appalled at the rapidity with which a case will leave us. I had a case where a boy fell across a bench, commenced vomiting, was taken home and in a very short time, I think it was only two days, I was called and found the boy dying. There was nothing to do, and I felt the only course was to send for a surgeon as quickly as possible and let him go into the abdominal cavity.

Dr. J. N. Warren, Sioux City, Ia.: It seems to me a somewhat muddled state of affairs that if a slight bruising of the abdominal walls and ice water would produce peritonitic or septic microbic infection, the treatment certainly was novel, yet the principle involved here is not new, for the reason that all abdominal surgeons utilize the principles. Greig-Smith records cases where he found

ample causes of distension, which he freely opened to the extent of bringing off all of the fecal matter present, and you can by such operation relieve the case.

Dr. J. Binnie, Poynette, Wis.: In regard to the paper that has just been read I do not wish to criticise. I doubt the diagnosis in the first place; the treatment is novel, but it brings out the treatment of traumatic peritonitis, and whenever morphine is mentioned I am ready to fight it. My treatment would be salines in moderation, with ice to the abdomen. I do not know what good heat ever does, and I will change my mind completely if I ever apply heat again. I have seen several cases of peritonitis following drinking large quantities of cold water after severe exertion. One case this summer, a man rapidly drank a quantity of ice water and was taken with a severe attack of peritonitis. I doubt the diagnosis of traumatic peritonitis in the case mentioned in the paper. I have had one case of traumatic peritonitis following the kick of a horse. I saw the case after it was hopeless, when the boy was dying, but there was a rupture of the intestine. Another man had the case in charge. I was sent for, the blow on the abdomen ruptured the intestine. I think the only treatment would have been to open the abdomen and close the intestine. It would be better to open and determine.

Dr. G. W. Jenkins, Kilbourn City, Wis.: I have in my mind a case of traumatic peritonitis. It was induced, I fully believe, as follows: The man was in the habit of tying grain, and when he bought the grain it was brought to him in bags, and he was in the habit of lifting them up, clasping them to his abdomen and carrying them to the bin and placing the grain in there. After he had practiced that for a good while he came to me and said he had acute pain in his abdomen for over two weeks or longer, and I told him to stop carrying that way, but he thought it was a slight thing and did not pay any attention to it. Matters went from bad to worse, and I gave him a mild cathartic, but keeping up his practice of carrying the bags in the way forbidden eventually resulted in an infusion into the abdominal cavity, and I withdrew the fluid by tapping. The man previously was a robust, healthy man. I had to tap him two or three times, and it finally subsided, and I cautioned him again, but, notwithstanding, he went out and required more tapping. Now I do not know whether you would call it traumatic peritonitis unless it was traumatism or something of that kind.

Dr. G. W. Johnson, Savanna, Ill.: I would like to ask some of these gentlemen the effect of cold water in traumatic peritonitis. The reason we apply over the abdominal cavity is to set up a certain amount of irritation and congestion and resulting in inflammation than it would in the cold water. I would like to have an idea as to the exact causation of ice water?

Dr. D. Macrae, Council Bluffs, Ia.: Long before any of us were born the drinking of copious amounts of ice cold water when a person was heated was the supposed cause of peritonitis.

"Fully many a boy has filled a cold sarcophagus
By taking ice water down his warm œsophagus."

That has been handed down to us from ages back. Personally, I do not believe it. I used to see cases of peritonitis that were said to have been caused by it. I believe we have traumatic peritonitis localized, and think it is very seldom that we have a general peritonitis as a result of trauma. In the case of boys coasting and falling down on their sled and producing a condition where there is a large amount of effusion into the peritoneal cavity is usually localized.

The case spoken of by the last gentleman I have had once or twice—of a young boy where the upper abdomen from the umbilicus up was enormously distended, and afterward the distension was gone, but the abdominal enlargement was general. I operated and removed a considerable amount of matter, and later found that the upper part of the cavity was again full and again tapped. On that occasion I left in a permanent drain; of course there was localized peritonitis. Another was the case of a young man who had received the injury in the right side of the abdomen from a man's fist, but there was a swelling and pus opposite the place where the man had received that injury. As far as the treatment of the distended intestine was concerned, I do not understand why it would be necessary to insert aspirating needles into the bowel.

Then, too, the danger, not so much of filth being introduced from without, but the idea of leaving a tube in the intestine for five days where the fecal material would follow the removal of the tubes; still the operations were a success, and I do not know that we can say very much against that, but it certainly would not be the method I would be apt to follow.

Dr. Bayley, closing discussion: I wish to say that the needles were not left in one location for the time of five days, and that the rectal tube was tried without any results. Now I admit the case was not seen until the fourth day. The question is whether that was appendicitis or a general peritonitis. I did not think that it was a case of appendicitis: I think that it was a general peritonitis. Now the idea was obtained either from Flint or Loomis' text-book. I believe that the case would have died otherwise if I had not passed the small aspirating needle in. At no time was there any intestinal fluid through the needle, simply the gas; nor were there any ulcers found around the needle. I could find but little authority on such a case and that was in the older text-books, but I believe that that procedure saved that patient's life.

Suture of the Lateral Sinus.

The suture of large veins, when wounded, is a surgical procedure which very recently has come into practice, and, like the ligature and clamp to control hæmorrhage, was suggested by the exigencies of operations, attempts being made by surgeons to preserve the patency of large veins in order to obviate the disadvantages, perhaps death, which would follow their closure. Successful experiments upon animals have been reported from time to time during the last eight years, and many surgeons have obtained good results by suturing the axillary, femoral, internal jugulars, and other large venous trunks. One of the most interesting of these successes was the suture of the inferior vena cava by Schede, after its injury, in an operation upon the kidney. At autopsy, some time later, it was seen that the stitches had held perfectly, and that the lumen of the vessel was well preserved. But, so far as known, Schwartz reports the first successful attempt at suture of the lateral sinus. His patient was a man, aged twenty-six, who presented himself with necrosis and a sinus behind the left ear, following a kick from a horse received three months before. At the operation (November 24, 1895), a piece of bone, the size of a silver dollar, was found depressed. It was adherent in part to the dura mater, and, despite every care, the lateral sinus was opened during its removal, a rent nearly half an inch in length being made. Hæmorrhage was profuse, but when two fine-silk stitches placed in the wounded vein were drawn tight the bleeding was controlled. The wound was lightly tamponed with iodoform gauze, and the patient made a good recovery. The central portion of the depressed area of bone was necrotic, and it was at this point that the adhesion to the sinus existed.—Boston M. and S. Jour.

The Antiseptic Value of Iodoform.

The results obtained by Lomry, in a series of experiments conducted upon animals and by bacteriological cultures in natural fluids, are in marked contrast to those obtained of late by bacteriologists, and tend to prove that the clinical observation of the value of iodoform as an antiseptic is fully justified, while the experimental bacteriological investigations which have been previously made were of little value.

The results which he obtained are the following:

(1) When wounds in dogs or rabbits which have been previously infected with the staphylococcus or streptococcus pyogenes are treated, the one with iodoform and the other without, it will be seen that the iodoform exerts a beneficial influence upon the wound. It has greater vitality and a better appearance. The leucocytes are at least as numerous and more active, the amount of secretion is decreased, and cicatrization is rapid.

(2) Credit cannot be given to the bacteriologists who declare that iodoform has no antiseptic action. They have attained their results by the use of culture media which did not dissolve the iodoform. When natural media are used for tests in vitro an active antiseptic action is seen.

(3) Iodoform decreases the virulence of the staphylococcus and streptococcus pyogenes.

(4) The iodoform neutralizes or counteracts the microbic toxins, but this neutralization or counteraction is only partial.

(5) The iodoform does not hinder, even to a slight extent, the ameboid movement and phagocytic action of the white corpuscles; but, on the other hand, stimulates their ameboid movement.—Bost. M. and S. Jour.

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NOTICES TO MEMBERS.

As this is the last number of The Railway Surgeon before the annual convention, it is issued in advance. The following announcements, which are self-explanatory, embody all the information available up to going to press.

THE SPECIAL TRAIN.

The Special Train on the Grand Trunk will leave the Dearborn Station (Polk and Dearborn Sts.), Chicago, at 3:00 P. M., on Tuesday, July 5, 1898.

Sleeping Car Rates.

One-half rates for round trip have been granted to members and their immediate families under the following conditions:

PULLMAN LINES.

Members will pay regular fare to Toronto and retain the conductor's receipt therefor. By presenting the conductor's receipt and membership card or receipt to the Pullman ticket agent in Toronto pass will be issued for return trip.

WAGNER LINES.

Members will pay their fare both ways, taking receipts therefor. By presenting or sending receipts with membership card or receipt to General Superintendent, Wagner Palace Car Company, The Temple, Chicago, one-half the amount paid will be refunded.

Members will please observe the above conditions carefully so as not to cause themselves or the companies any unnecessary annoyance.

A. I. BOUFFLEUR,
Chairman Executive Board.

RESERVATION OF BERTHS.

Members who intend traveling by the special train must inform the local ticket agent, Mr. L. R. Morrow, 103 S. Clark St., Chicago, at once, so information may be had as to the number of cars required. There are a number of other large conventions taking place (C. E., etc.), and sleeping cars are scarce. So, unless early announcement is had of the number going by the "Special," members will be disappointed in securing accomodations.

Western Passenger Association,
Chicago, June 21, 1898.

We are to-day in receipt of communication from Mr. F. C. Donald, Commissioner Central Passenger Association, advising that he will announce rate of fare and one-third for the round trip on certificate plan for the meeting of the I. A. R. S., to be held in Toronto, July 6-8.

We take pleasure in advising you that we will also announce rate of fare and one-third for the round trip on certificate plan for this occasion from points in Eastern Committee and Trans-Missouri territories of this Association, and note that certificates will be signed by Dr. Louis J. Mitchell, secretary.

B. D. CALDWELL, Chairman.

This is conditional on 100 applications being made.

WISCONSIN CENTRAL LINES.

We will return those attending I. A. R. S., to be held at Toronto, who pay full fare over this road in going, for one-third fare, on pre-

sentation of a receipt from the agent of this company, at the railway station from which they start on this line, going to the meeting, for the full fare paid, which receipt, when filled up and countersigned by the secretary of the meeting, certifying that the holder was an attendant, will be honored by our agents at Chicago, Milwaukee and Manitowoc for tickets to return, at the reduced rate, until July 12, 1898.

Note.—If delegates pass over two or more railways en route to your meeting, they should procure receipts for the full fare paid going over each line, as return tickets will only be issued locally by each company. Blank forms for the above purpose are in the hands of all the station agents, and will be issued as receipt for full fare paid on application.

In order that there may be no misunderstanding on the part of delegates attending your meeting, it will be well for you to communicate with them, either directly or through the public press, the fact that it is necessary for them to procure receipts for the full fare going, as no return tickets at the reduced rates will be issued, except this formality is complied with.

JAS. C. POND,
General Passenger Agent.

Local Committee.

The following gentlemen are acting on the Local Committee of Arrangements, I. A. R. S.:

Prof. T. G. Roddick, Montreal; Sir. W. Hingston, Montreal; Drs. J. Alex. Hutchison, Montreal; J. Bray, Chatham; A. McKay, Ingersoll; L. B. Powers, Port Hope; J. Coventry, Windsor; Dr. Gunn, Clinton; D. M. Fraser, Stratford; C. A. Taylor, Goderich; J. Thorburn, C. O'Riley, J. E. Graham, Adam Lynd, A. J. Johnson, J. F. W. Ross, W. Oldwright, R. B. Nevitt, Geo. Peters, A. H. Wright, J. Noble, T. McKenzie, C. A. Temple, G. H. Burnhan, R. A. Pyne, P. H. Bryce, Chas. Sheard, J. Cassidy, H. A. Bruce, H. T. Machell, J. Gilmour, W. E. Gallow, W. Pepler, E. E. King, J. Dwyer, A. A. MacDonald, W. A. Young, J. D. Thorburn, H. H. Oldwright, Mr. Ald. Bowman, Mr. Ald. Dunn, Mr. Ald. Richardson, all of Toronto.

B. L. RIORDAN,
Chairman Committee of Arrangements.

Extracts and Abstracts.

Preparation of the Patient for Operation.

By Byron B. Davis, M. D., Omaha, Neb.

No deliberately planned operation should be undertaken without careful preparation. Exactly what steps should be taken to bring the patient to the operating table in the best possible condition there is more or less difference of opinion. Thinking that a free discussion of the views and customs of members of this society cannot fail to be of benefit, I bring this subject forward, not with the idea of attempting to crowd upon you my own views, but with the hope of provoking a frank and free discussion upon a subject of importance to every practitioner who is ever called upon to do any operation, from that of amputation of a finger to that of extirpation of the stomach.

As has been so clearly pointed out by Dr. Roswell Park, the past few years have been zealously employed in learning how to prevent infection from without, it now becomes equally mandatory to learn how to prevent infection from within. It matters not how painstaking the mere technique of an operation is carried out, if the internal toilet is given stepmotherly attention there will be many needless failures, many complicated convalescences.

Before beginning the formal preparations it is important that as accurate a diagnosis be made of the lesion for which the operation is undertaken as the circumstances will permit. This includes the use of all the ordinary means of clinical diagnosis—symptoms, physical signs, chemical, microscopical, and bacteriological research if there be any chance of their proving of use, and employment of all the instruments of precision which the thorough study of the case demand. If a preliminary examination under anæsthesia promises to add anything material to the knowledge of the case, the anæsthetic should not be withheld.

An accurate diagnosis may prove an operation uncalled for; it may prove it useless. Uncalled for it certainly is if it is not going to remove the symptoms for which the patient seeks relief; useless, and worse than useless, if the disease is of such a nature that a fatal termination is inevitable. This is often true of far-advanced malignant disease when there is no hope of permanent cure and no prospect of temporary relief. Another condition often better left unoperated upon is advanced peritoneal sepsis from appendicitis or other cause—operation often hastening the

necessarily fatal end. Too great readiness to use the knife in these two classes of cases has done much to produce on the part of the laity an unwholesome dread of all operations. With a good working chance of success it is one's duty to take advantage of that chance, but to be persuaded into operating upon these hopeless cases because of fear of criticism for overtimidity, or because of the lack of the moral strength to say "no," can only injure the operator personally and bring discredit and abuse upon all surgery.

A careful diagnosis of the lesion is also useful in that it gives an opportunity to correctly plan the steps of the operation in such a manner as to save time and prevent shock and loss of blood.

The diagnosis having been made and operation shown advisable, it is important to study the patient with the view of discovering any and every condition likely to militate against the best possible results. The ability to withstand shock should be considered. Steps should be taken to insure prompt repair of the wound, guarding equally against external and internal infection. Among the various dangers from within may be counted especially micro-organisms and toxic substances carried in the circulation.

To secure internal asepsis the first step is to eliminate all possible sources by which germs can gain entrance into the circulation. All pustular skin diseases should, as far as possible, be removed. The tonsils and buccal cavity should be carefully inspected and if any disease is found it should be cured or at least the surfaces rendered as mildly septic as possible before doing any serious operative work, unless it be an operation of emergency, with which this paper does not deal. Nasal catarrh, bronchial catarrh, suppurative disease of the middle ear, urethral discharges, etc., should be given careful attention before operating. No major operation should be undertaken until any existing boil, felon, or other abscess is cured, unless delay of the operation will entail greater risks than will be engendered by the probable presence of septic germs in the circulation; always remembering that it is better for a patient to die of a disease for which the surgeon is not responsible than of preventable sepsis after an operation.

That all these danger elements can be eliminated in every case is not claimed, but that they should be taken into careful consideration and rendered as nearly inert as the conditions will permit are demands which only common prudence dictates. Absolute disinfection of all points from which internal infection may originate is not always possible, but disinfection as complete as can be done will minimize the danger.

Autoinfection from the presence of micro-organisms is only an accidental condition, not applying to even a majority of cases. Passing to the second danger which threatens operative cases, one is confronted by a danger common to all. Autotoxemia is so frequent, its sources of origin so numerous, often so difficult to recognize, and always so hard to control, that there is a temptation to shut one's eyes and trust to blind luck or Providence, according to the religious beliefs one happens to hold. There are the toxic substances dependent upon imperfect oxygenation in the lungs; those dependent upon defective hepatic and skin functions; those which may be retained in the economy because of renal insufficiency; those myriads of deadly toxines elaborated in the alimentary canal; and now come other claimants for our attention in the persons of the internal secretions of various organs and glands.

How best to meet all the requirements necessary to forestall against the dangers which arise from defective physiological function is beyond present knowledge. A few simple precautions can be taken, and an effort will be made to point out a few of the most palpable sources of toxemia and the suggested method of minimizing the quantity of toxines carried by the circulation.

The body is constantly forming and casting out toxic substances. As long as the excretion of these substances is approximately equal to their elaboration, a state of equilibrium is maintained. In normal physiological activity the elimination by skin, lungs, bowels, and kidneys prevents the accumulation in the circulation of a poisonous dose of these harmful products. After an operation without careful preparation all this is changed. Elimination is at a minimum. The same quantity of toxines, innocuous under normal conditions, will now produce toxemia. To guard against this evil it is necessary to forearm (1) by eliminating beforehand, as far as possible, toxines; (2) by discouraging the elaboration of more toxines; (3) by maintaining after the operation as normal a condition of the emunctories as the conditions will permit.

Any irregularities of digestion can be much better corrected before than after the operation. The convalescent from a surgical operation is often kept back and fails to gain strength because of gastric disturbances which might have been corrected beforehand. The same is true of the hepatic functions, any catarrh of the biliary passages, etc.

The skin should receive careful attention and the urine should be examined with the most painstaking care. The quantity of water and solids for the twenty-four hours must be accurately measured, and if it departs much from the normal in either direction an effort made to correct the defect before entering upon the steps of the preparation which im-

mediately precede the operation. Among the solids of the urine which are likely to be especial causes of trouble if not eliminated in normal quantity may be mentioned the salts of potassium and the coloring matters. Recent experiments have shown that the coloring matter represents about one-half of the total toxicity. On the other hand, urea was found to be much more innocuous than has been supposed, the potassium salts being several times more toxic. A pale urine, therefore, or a urine containing less than seventy or eighty grains of the potassium salts in twenty-four hours, should be viewed with suspicion.

Suppose, now, an operation has been decided upon, and the heart, lungs, and emunctories are found to be in a fairly normal condition, I am in the habit of putting the patient upon about the following treatment for the two or three days preceding the operation:

The second evening before the operation calomel and soda are administered, either in one dose or in several divided doses. On the following morning Rochelle or Epsom salts are given in drachm doses every hour until thorough purgation is secured. If an especially empty condition of the alimentary canal is desired, as in gastric and intestinal work, the purgation is usually begun the third evening before the operation, but this is not usually necessary, and should be avoided when possible, since it undoubtedly lessens the patient's ability to withstand shock. The evening before, if the operation is to be in the morning, and in the morning if the operation is to occur in the afternoon, a copious enema is given, in order to insure thorough emptying of the large intestine. The practice of giving an enema immediately before operating is not followed. It is not approved in any case, but is especially to be condemned when the operation is about the vagina or rectum. To have the bowels move while operating in this locality is not only unpleasant, but may cause fatal sepsis.

The use of the various intestinal antiseptics is not practiced much, because of (1) a feeling of skepticism about their doing much good, and (2) disinclination to add to the number of drugs ingested on account of their tendency to derange digestion.

For the two or three days preceding the operation, the patient is put upon a good, nutritious liquid diet. This, in conjunction with the purgation, insures a reasonably empty stomach and intestine, and the less material in the gastro-intestinal canal the less toxines will be formed and the dangers of autotoxemia will be by this much diminished.

A general warm bath daily for two or three days before operation not only assists sepsis by making the body clean, but promotes cutaneous activity. If the patient is weak and toneless, each bath should be followed by an alcohol rub.

The patient should also, during the days of preparation, be urged to drink large quantities of water. This not only increases the volume of the urine and thus causes it to carry away a larger quantity of the urinary solids before the operation, but increases the quantity of the urine for a day or two following the operation, and I believe in this way guards the kidneys from some of the unfortunate results which occasionally follow the administration of anæsthetics. It also prevents to a great degree the distressing thirst to which patients are so subject the first few hours after an operation, while the stomach is not yet in a condition to safely bear liquids. The use of a rectal enema at the close of an operation also contributes to the same result and is good routine practice.

An antiseptic mouth wash used frequently during the preceding one or two days, mandatory when the operation is about the oral cavity, is undoubtedly a valuable expedient as a preventative of inspiration pneumonia and bronchitis, usually, if not always, germicidal in origin, the irritation of the anæsthetic lowering the resisting power of the bronchial mucous membrane. The mask provided for administration of the anæsthetic should also be aseptic, and a new one should be at hand in case of soiling from vomiting or spitting.

For two or three days before the operation sulphate of strychnia, in doses of 1-30 to 1-20 grain, should be given three or four times daily. This drug does much to reinforce the heart and respiratory muscles and will forearm the patient against undue shock. Strychnia also serves a useful purpose before all celiotomies. Distention of the bowels by gas is one of the most distressing, not to say dangerous, post-operative symptoms in this class of cases. During the past two and one-half years I have made use of strychnia as a routine practice before all operations and have very rarely had a case suffer from inability to pass gas. Strychnia, with the property of increasing the tone and power of the muscular fibers of the intestines, as well as of the muscles of the abdominal wall, causes gas to be forced onward as soon as formed. It is fair to say that in all celiotomies, and other cases in which there is much depression, the use of the drug is continued after the operation.

Preparation of the field of operation will, of course, depend upon the condition present and the location. I direct the nurse to shave and scrub with soap and water, using a firm, but not too stiff, brush, not only the field of operation, but a large surrounding area. After this procedure a poultice of soft soap is applied, and covered with rubber tissue or waxed

paper. This should be done twelve to eighteen hours before the proposed operation. After remaining on several hours, the soap poultice is removed and the field rescrubbed as carefully as before. By this means the superficial epithelial cells, with whatever germs they contain (bacillus epidermidis albus), are removed. Washing with ether follows, to dissolve away all fat. Next a large compress of gauze wet in 1-2000 bichloride solution is laid over the field covered with rubber tissue, and bound on. This compress remains on until the patient is under the influence of the anæsthetic. It is then removed, a final scrubbing administered, and the field washed with alcohol. Alcohol is used not so much as an antiseptic agent as for its properties as a hardening agent, imprisoning, so to speak, any germs which may perchance remain.

Variations from these steps are made use of according to the site of operation. For example, if the stomach or upper intestinal canal is to be involved in the operation, in addition to the procedures already mentioned, the stomach is washed out with boric acid solution or Thiersch's solution just before beginning the anæsthesia.

If the female genitalia or bladder are to be operated upon a creolin douche is given three times daily during the days of preparation. The final douche should be given immediately preceding the anæsthesia. After being brought under the anæsthetic the vulva and vagina are thoroughly scrubbed with soap and water, followed by bichloride and alcohol, a gauze sponge, held by forceps, being used for the vagina instead of a brush.

Should an abdominal hysterectomy be contemplated, after the preparation of the vagina, as just given, the uterus should be curetted, washed out, swabbed with carbolic acid and iodine, and packed with iodoform gauze. I know of no greater menace to infection, when the body of the uterus is removed and a part of the cervix left, than that from the cervical canal, the infection being carried by the blades of the scissors while cutting away the body. It is only by this careful preparation that infection from this source can be reduced to a minimum.

I do not approve of a long period of preparation. From the time the formal preparation is begun until the hour of operation it can be laid down as a truism that, with rare exceptions, the patient will not thrive. One is not likely to appreciate the dread, the anxiety, the fear which many patients experience from the hour an operation is decided upon. Digestion under such circumstances cannot be normal; there is a severe nerve strain, and deterioration in the condition is constant and sure. Therefore I do not agree with those who prefer to have the patient in a hospital a week on more before the operation "in order that he may become familiar with the surroundings." All the formal steps needed after any existing complications have been cared for can be carried out in two or three days' time, and, as a rule, every day added is a distinct loss. During these days, as far as possible, rest to body and mind should be secured. The surroundings should be cheerful, but in spite of our best efforts in this direction the sensitive patient will suffer keenly during the days of preparation.—(West Med. Rev.)

Treatment of Elbow-Joint Fractures.

By Dr. H. L. Smith, Nashua, N. H.

For several years I have treated all fractures involving the elbow-joint by placing the forearm in acute flexion. The results have been, without exception, satisfactory.

Not to repeat in detail the steps which led to the adoption of the method to be described, I may say, in a word, that as the result of repeated experiments with fractures artificially produced upon the cadaver the conclusion was reached that in no way could the fragments be so firmly and exactly replaced and held in position as by flexing the forearm forcibly upon the arm. The results obtained were entirely unexpected, and, in fact, a priori were somewhat improbable. It was with considerable hesitation, therefore, and with no little misgiving, that the principle involved was first applied clinically. From a review of the cases, now numbering upward of thirty, in which this method of treatment has been employed, it seems well within the truth to say that by its use one may be reasonably sure of results fully equal to those obtained by the older methods, while at the same time it is a great relief to feel safe in discarding the clumsy, ill-fitting, and heavy apparatus which is a constant care to the surgeon and a burden to the patient.

From a study, with careful measurements, of upward of a hundred cases of elbow fractures, seen after the lapse of from one to five years, it appears that under the methods usually employed, the final result, so far as the usefulness of the arm is concerned, can very rarely be considered a poor one. In fact, many cases which have left the dispensary or the surgeon's care with a considerable degree of stiffness and consequent disability, and this even three or four months after the injury, have ultimately been found in a far better condition than it was anticipated they ever could be. It would seem that at least a year must elapse before the final result, as regards usefulness, can be known. Moreover, it appears, and this fact bears directly upon the point discussed in this paper, that the motion of the joint in the direction of exten-

sion is much more easily regained than that toward flexion, and that, in consequence, more real discomfort arises from the inability to take food, dress the hair, etc., than from any limitation at the other end of the arc of motion.

Within the past ten years a good deal has been said about the so-called "carrying function" of the elbow-joint, by that being meant the angle, opening outward, between the arm and forearm, when the latter is extended. This point has been considered by some writers so important that in order to preserve such an angle, and for no other reason, it would seem, these injuries have been treated with the forearm fully extended—certainly a dangerous practice in all cases where anchylosis is likely to occur—and one which ought to be backed up by the most weighty reasons.

As a matter of fact, however, I cannot believe that the "carrying angle," as such, ought to be taken into consideration in the matter; or, if at all, only as of secondary importance. In the first place, it is almost never the same on the two sides in the same individual, and differs very widely in different persons, amounting on the average to less than ten degrees, occasionally rising as high as thirty degrees, and often sinking to zero, or even less, then forming a reversed angle. This variation occurs in uninjured, perfectly functionating arms, and not only so, but even those individuals in whom, by reason of injury, this angle has become lost or reversed, very soon learn to overcome any slight inconvenience or awkwardness arising from this cause; at any rate, their earning capacity, if they are dependent upon manual labor, is not materially affected.

It is true, of course, that an arm with an inward angle, presenting what is called by Allis the "gunstock deformity," in so far as it fails of restoration to its exact former condition, leaves something to be desired, if only in an æsthetic sense. But, since the abnormality presents itself only when the arm is fully extended, the thumb pointing outward, a position which is rarely assumed under ordinary conditions, whereas it entirely disappears when the right angle is reached, it must very rarely happen that the non-professional eye would observe the defect. It is not unusual, indeed, for the parents or friends to express surprise when their attention is first directed to such a condition in the person who has been under their constant and caretaking observation.

While, therefore, I cannot concede that the preservation of the normal angle, for itself alone, is of sufficeint importance to be made a reason for any definite method of treatment, yet we must acknowledge that of two given cases, where the restoration of function is equally perfect, that result must be considered most satisfactory in which the former relations of the arm and forearm bones are most nearly restored. And conversely it is to be presumed that the restoration of function will be very nearly proportional to the accuracy with which the broken-off fragments are replaced, and the steadiness with which they are held in position.

This fact will, perhaps, be made clearer if we consider what it is that produces the natural elbow angle. All the text-books agree that the outward deviation of the forearm is due entirely to the fact that the internal condyle of the humerus projects downward farther than does the external, thus bringing the line of the articulation at an oblique angle with the shaft of the humerus instead of at right angles to it. This is but a part of the truth. The articular surface of the ulna does not correspond with the line of the shaft of that bone; and this difference in direction is almost as great as in the case of the humerus. It is the sum of these two angles which forms the normal carrying angle.

The truth of the above proposition is easily shown. If the angles were due entirely to the humeral articulation the forearm would be brought inward across the chest when acutely flexed. This does not happen unless the shoulder-joint is moved. On the other hand, if both bones enter as a factor into the result, then in full flexion the forearm would come into the same or nearly the same plane with the upper arm, one obliquity merely counteracting the other. As a matter of fact this is just what happens.

Accepting as proven the statement that the ulna does thus enter into the problem, the practical deduction is obvious. If it be possible in practice to keep the forearm acutely flexed until the broken parts are glued safely in position, then, when extension is made, the ulna, bearing the forearm and hand, will of necessity be carried outward and the angle will be reproduced. The only conditions of which I can conceive where this might not be literally true would be where the articular ligaments are entirely torn away, the fragments being quite free from the ulna.

From the experiments already alluded to, it appeared that by means of a particular maneuver, carried out while the forearm was being flexed, the fragments were almost invariably brought into exact position, and that they remained firmly fixed so long as acute flexion was maintained.

It was also found that owing to the peculiar confirmation of the articular ends of the bones entering into the joint, while with the forearm at right angles it was an easy matter for the two condyles to so change their relation with each other as to produce the gunstock deformity, since to effect this under such circum-

stances requires merely that the forearm be rotated inward or outward, thus either lifting the internal condyle, if that is separated, or depressing the external condyle, if that be the part broken off, or displacing both these parts, or the entire articular end of the bone, in case of more extensive injuries; while this, I say, can easily be done with the joint flexed to the right angle, yet if the flexion be carried to an acute angle the case is entirely different.

Under the new conditions it would be necessary that the hand should be carried to one side or the other, over a considerable arc, in order to make even a slight difference in relative height of the condyles. But as long as the arm and forearm remain in the same plane that they naturally occupy when flexion is acute, provided, of course, the fragments are still attached by any periosteal or ligamentous fibres to either the broken shaft of the bone above or to the upper extremity of the bones below, we may feel sure that such a change in the relative height of the condyles is impossible.

To recapitulate briefly—as a result of experiments, the fact appeared that nothing would hold the fragments at the lower end of a broken humerus so well as acute flexion of the joint. This was true in every instance, whether the fracture were of a single condyle, of both condyles, a transverse fracture, or a separation of the epiphysis.

Again, after a study of the anatomy of the joint, it appeared, from theoretical consideration, that the preservation of the normal joint-angle would best be assured by the use of the same acute position, while it would most easily be lost in the position ordinarily employed in treating these injuries, viz., that of the right angle.

Is the treatment here proposed feasible, convenient, comfortable to the patient, attended with satisfactory results, and, above all, is it safe? I can only repeat that in my experience it has proven to be all these, and the final result, as shown by comparison after careful measurements, show that the amount of motion acquired is greater than the average obtained by the older methods; while the difference as regards the carrying angle is unmistakably in favor of treatment by acute flexion.

The practical application of the treatment is as follows: Reduction is accomplished by a motion of extension in the axis of the humerus, the hand being closed below the joint, while, at the same time, the forearm is flexed and rotated inward, with the intent to carry the internal condyle as low as possible. This is the manipulation already referred to which was found in practice on the cadaver to produce the best results.

Acute flexion having been obtained, it is not necessary, in fact, it is not feasible, to employ any kind of splint. All that is necessary is to fasten the forearm in place by a strip of adhesive plaster, carried around the wrist and about the upper arm as high as possible.

If thought best the weight of the hand may be supported by a narrow sling passed around the wrist and over the neck; a full arm-sling is not as necessary as when a heavy splint is worn, and cannot, in the flexed position of the arm, be as easily applied.

In case much swelling has taken place before reduction has been made, it may be deemed best not to force flexion too far in the first instance, although I have yet to see any unpleasant symptoms arising from too great pressure under these circumstances. If, however, doubt is felt on this point, or the patient complains of the tension, it is easy to rearrange the adhesive band from time to time. As it is the tension of the soft parts that preserves the relationship of the fragments, it is only necessary to keep up a continuous fixity of those parts, so that a larger degree of flexion answers the end equally well where the infiltration is considerable.

The important point to bear in mind, so far as safety from undue pressure is concerned, is the fact that no foreign substance is placed between the contiguous surfaces entering into the joint. If the arm be forcibly flexed while covered with the ordinary clothing the radial pulse will be lessened perceptibly to the examining finger. With the unclothed arm no effect can be thus produced. A fresh infiltrate is of so fluid a character that it will be squeezed out of the compressed tissues; only a loose fragment of bone could so shut off the circulation as to endanger the extremity.

Long-continued enlargement, stiffness, and consequent disability, after a fracture involving any joint, usually results from some extraordinary infiltration. It was to obviate this unpleasant feature that the old surgical authors advised the application of a roller bandage in all cases before the application of a splint. The manifest danger of such practice, owing to the inability of the surgeon or patient to see the affected part while thus entirely covered, has led to its abandonment. In the present instance, however, there is no pressure from without, no impediment to venous return, since the pressure is not brought to bear upon the whole circumference of the arm, but at one point only, and more than all, the appearance of such an arm, after some days of such flexion as has been described, is a clear indication of the rapid manner in which absorption has gone on where pressure has occurred, the anterior aspect of the joint presenting a normal color and outline, sharply in contrast with the discolored, swollen, and boggy tissues on each side.

Passive motion, especially at an early date,

I believe to be not only useless, but many times harmful. If the joint surfaces are extensively bruised, if the general laceration of tissues is so great that adhesions will form in any case, then continual motion and irritation will but increase the amount of deposit, and the final bands of adhesion will but be the larger and the more dense. To insure a large exudate about a slowly uniting fracture in the shaft of a bone, we purposely set up just those movements, which, in the case of a joint, we undertake for the very opposite purpose, viz., to lessen the firmness of the attachment. It strikes me that if the problem before us were to obtain a joint with the least possible motion, after there had been extensive lacerations of all parts entering into its construction, we should think best to begin our pumping and turning and generally irritating measures, at the very beginning, would apply no fixative apparatus whatever, but encourage the patient to keep up a constant disturbance in the cellular relations of the injured tissues.

It was long ago shown that the fear of anchylosis resulting from simple fixation of a joint is absolutely baseless. In order to get union by first intention, with slight scar formation, and consequently slight after-construction, we first seek to get perfect apposition, and then to insure absolute immobility until union is complete. Applying the same rule to the problem in hand, we are justified in assuming that the best results may be expected to result from that course of procedure which should replace all injured parts accurately, hold them in place immovably and continuously until union should be accomplished.

Acting on this principle, I believe we should avoid all meddling with our joint fractures, allowing them to remain at rest for four, five, or even six weeks in certain severe cases, and that by so doing our results will be, on the average, better than under an opposite course.

Latterly this has been my invariable practice, and nothing has occurred to indicate that either the reasoning or practice is erroneous. —Journal of Medicine and Science.

Treatment of Wounds.

By J. E. Summers, Jr., M.D., Omaha, Neb.

PUNCTURED WOUNDS OF THE BRAIN.

Clinically, these injuries seldom occur except through the orbital plate of the frontal bone. A very few rare cases have been reported of the puncturing instrument entering through the nostrils. An instrument may be driven through the skull at any part and wound the brain. A considerable variety of instruments have been known to penetrate the brain by way of the thin orbital plate of the frontal bone, the most common having been unbrella sticks, canes, pieces of wood, narrow-bladed instruments of warfare, etc. The eye not uncommonly escapes injury when the entering instrument fractures the orbital plate near the superior orbital fissure. In such cases, the wound first passes through the upper eyelid. A part of the puncturing instrument may remain in the brain. The injury to the brain is usually confined to the frontal lobes, but may involve other parts. If the brain is punctured through the optic foramen the eye is almost certainly injured, and the optic nerve is necessarily crushed or divided, unless, perchance, the puncturing instrument is of very small diameter, like a hatpin. Besides any injury to the eye which may complicate these accidents, the main danger lies in the brain lesion. Not so much, usually, the immediate results from destruction of brain tissue, as the secondary inflammatory processes likely to arise as the effect of the injury. Hæmorrhage may be sufficient to produce dangerous pressure symptoms, but this will hardly occur unless the injury is through the floor of the orbit toward the vessels at the base of the brain.

The treatment of these injuries should be directed toward an exposure of the injured parts sufficiently extensive to enable the surgeon to examine carefully for the presence of a foreign body when from the history of the case such a body may have remained in the wound. The surgeon should not limit his interference until he has cleared a passage for careful irrigation and drainage of the injured brain. Although it may be necessary to boldly open up the skull in front of and above the track of the wound, usually it will suffice if, after shaving the eyebrow and using the usual antiseptic precautions, the orbital plate of the frontal bone is exposed by making a free curved incision along the upper edge of the orbit down to the bone, separating the loose, cellular tissue, and depressing the globe with a small flat retractor. By this means sufficient space will be secured for the exposure of the wound. With small chisels the opening through the bone is enlarged sufficiently to explore the wound and provide for drainage.

Should the brain be punctured through the optic foramen, the eyeball must be removed to admit of proper exploration and drainage. In such a case, even if the globe of the eye is not injured, the optic nerve probably is, and in any case it is better to sacrifice the eye than to invite secondary inflammatory conditions in the orbit, and maybe in the brain. A good general rule would be that in all cases the bottom of the wound should be explored and drained by the most direct route, preserving the integrity of an uninjured eyeball when possible. If the eyeball is wounded and probably infected it should be removed. The inflammatory swelling of the loose connective tis-

sues of the orbit is a source of great danger. The swelling interferes with drainage, and inflammation may pass from infected orbital tissues along the track of the wound to the brain. When practicable, the counsel and assistance of an expert oculist should always be sought in the treatment of these complicated injuries.

In those rare wounds of the brain through the nostrils the base of the brain should be freely exposed by making an opening through the frontal bone. Most painstaking antisepsis must be employed so as to limit probable infection derived from the nasal cavity.

PENETRATING WOUNDS OF THE CHEST.

Even in civil practice a large percentage of wounds of the chest are caused by bullets, yet not a few are made by sharp-pointed instruments of various kinds. The general principles involved in the diagnosis and treatment are essentially the same. We can best classify puncturing wounds of the chest into those which pass through the chest wall into the pleural cavity, and those which, after penetrating the costal pleura, wound the lung, pericardium, heart, or large vessels. The first variety is not usually immediately serious, but may become so; the dangers are hæmorrhage from the wounding of an intercostal vessel or a secondary septic empyema. Rare cases have been recorded of hernia of the lung. When the wound is low down, the diaphragm may be divided and omentum or intestine pass upward through the wound in the diaphragm.

Wounds of the lung are very dangerous when the inflicting instrument, if a bullet, is a large one and passes into or through the lung near it base. The same rule applies to wounds from knives and other sharp-pointed instruments. Small wounds into or through the thin edge of the lung are not very dangerous.

Wounds of the heart are usually immediately fatal. Wounds of the pericardium, although exceedingly serious, are recoverable. Penetrating wounds of the mediastinum which are not immediately fatal from hæmorrhage will become most serious should infection occur.

The diagnosis of penetrating wounds of the chest depends mostly upon a good knowledge of physical diagnosis and the meaning of the symptoms of shock and hæmorrhage. If after antiseptic precautions a sterile probe enters the pleura, the wound is a penetrating one. If the inflicting instrument is small, and the wound of entrance over and its supposed direction toward the thin portions of the lung and away from the heart and chest center, the presumption is that comparatively little danger is to be anticipated, especially if all symptoms of hæmorrhage are absent.

Symptoms of Hæmorrhage.—The raising of bloody sputa proves pretty well that the lung is injured. The more or less rapid accumulation of fluid in the pleural cavity indicated by the physical signs of hydrothorax or hydropneumothorax, accompanied by the usual general symptoms of internal hæmorrhage, proves that blood is accumulating in the pleural cavity. If the force, size and direction of the bullet or cutting tool indicate a lung injury, especially if some blood, even a little, is coughed up, the source of hæmorrhage into the pleura is probably from a wound in the lung. The pneumothorax may come from inspired air or from being sucked into the chest through the wound in the chest. Hæmorrhage from the wound, if bright red and spurting or active, comes from an intercostal or internal mammary artery; if dark and flowing in character, it is probably from the lung. Emphysema, when present, usually comes from air which has been inspired. The air may have come from without into the wound. The greater the shock the more serious the injury, especially if the temperature is subnormal.

In a recent case of the writer's where there were two wounds made by a large bullet, the wounds of entrance and exit being five inches apart, he was able to demonstrate that the lung was not injured. This proves that in rare instances it is possible for a wound of this character to exist without perforation or even grazing of the lung.

The differential diagnosis between wounds of the pericardium and wounds of the heart may be insurmountable. In both there is apt to be sharp pain, more intense if the heart is injured. Dyspnea is more marked if the heart is injured and the physical signs of the presence of fluid in the pericardium are present almost immediately and increase rapidly.

In wounds of the pericardium, the cardiac syncope is less intense, the blood in the pericardium accumulates more gradually. The wound of the heart may of itself cause death almost immediately or in a short while, but when death is delayed a few hours it is usually due in great part to over distention of the pericardium with blood. Death may result from secondary inflammation. In wounds of the pericardium death is due to the same causes.

The treatment of penetrating wounds of the chest, involving the chest wall and lung is usually best limited to the internal administration of opium and the local application of a primary antiseptic dressing. If the chest wall is at all lacerated, hæmorrhage should be controlled, all loose fragments of ribs and any foreign body discoverable removed, and drainage provided. If a ball has passed through the chest and lodged under the skin, it can be removed, but it is folly to probe or explore with the finger in order to discover a bullet in the lung. There is great danger of setting up hæmorrhage or inflammation. Secondary

operations within the pleural cavity, or even the lung, are safer than too active interference in primarily dangerous injuries. Unless dyspnea points toward impending death from the loss of blood and its accumulation in the pleural cavity, surgical interference is not indicated. Absolute rest should be enjoined, ice applied to the chest, and opium and ergot given internally. If the source of the hæmorrhage is thought to be an intercostal artery or the internal mammary artery (we can tell something about this from the relation of the wound to the ribs and its position in the chest), it should be exposed and tied.

Aspiration or incision for the evacuation of blood from the pleural cavity may be practiced if suffocation threatens death, but in these cases death may follow from a continuance of the bleeding. Under such conditions there may remain nothing to promise hope other than a bold resection of a sufficient number of ribs to allow of the packing into the pleura and against the lung of a sufficient quantity of sterile gauze to control the hæmorrhage.

Pneumothorax and empyema resulting from infected blood accumulations are treated upon general principles, viz., the former may be aspirated, the latter can be treated successfully by incision and drainage.

A wound of the heart had better be left to nature. She sometimes brings about recovery. These wounds have been dealt with successfully. The pericardium is exposed by either an osteoplastic resection of the ribs or a permanent resection. The pericardium is then incised and the wound in the heart repaired by suture. Drainage must be provided for accumulations within the pericardium. If a case of wound of the heart or pericardium, or both, perhaps, threaten death from blood pressure within the pericardium, the sac ought to be aspirated, or even drained.

A hernia of the lung following a wound of the chest should be reduced and the wound closed by suture and supported by suitable dressings. Should the diaphragm be wounded, a complication of a penetrating wound of the chest and a protrusion of omentum or bowel into the chest follow, the condition might be recognized by physical signs, and the symptoms of obstruction of the bowels. A free opening into the chest should be made in a suspected case of this kind, and if a hernia were discovered it should be reduced and the wound in the diaphragm sewed up.

Penetrating wounds of the mediastinum require the most painstaking antiseptic treatment.

THE TREATMENT OF INCISED AND PUNCTURED WOUNDS OF THE ABDOMEN.

The general principles of surgery involved in the treatment of penetrating gunshot wounds of the abdomen apply equally to lacerated, incised and punctured wounds of the abdomen, produced by blunt or irregularly shaped bodies and by those of broad or narrow keen-edged instruments.

All non-penetrating wounds of the abdominal wall should be treated upon the same principles as wounds of the same kind in other parts of the body—particular attention being paid to accurate approximation of the separate muscles and fasciæ by buried sutures. When doubt exists in the mind of the surgeon as to whether or no the peritoneum has been opened, digital and instrumental exploration—with, if necessary, careful enlargement of the wound—will usually decide this point, or, being still unsettled, the abdomen may be opened in the median line and the peritoneal area of the abdominal wall beneath the wound examined by sight and touch.

If inspection or the examinations just indicated demonstrates that the peritoneum has been opened, the line of treatment to be followed is clear and positive. Those in which there is a greater or less protrusion of omentum and intestines, one or both should be carefully washed with warm sterilized water, any bleeding mesenteric vessels tied, wounds stitched. Then the protruding parts should be carefully washed again and returned into the cavity and the abdominal walls sutured. This treatment is absolutely necessary to save life and may be done by any physician. In all cases, whenever it is uncertain what the extent of the injury may be, whether or no any viscus is wounded, the abdomen should be opened, usually in the median line, and a careful search made for injuries, and, if found, they should be repaired by the simplest and most rapid methods consistent with accuracy. It is oftentimes impossible to tell if a viscus has been wounded, no matter what the shape of the offending instruments or the locality of the wound where it was forced through the abdominal walls. There may be little or no shock or symptoms of hæmorrhage, and yet extensive trauma exist. The many differentiating signs between involvement and non-involvement of the various abdominal viscera after penetrating wounds of the abdomen are valuable, but all are unreliable and not absolutely to be depended upon, and there are no means, short of abdominal section, by which this can be positively determined. Stab wounds are more likely to be followed by hæmorrhage than bullet wounds; yet the instrument does not so often injure the bowels, especially if they are comparatively empty. The swift-moving bullet enters the intestine whether distended or empty; the cutting, slowly moving instruments may simply push them aside. The use of hydrogen gas, as recommended by Senn, is perhaps the most trustworthy method of determining whether

or no the stomach or intestine has been wounded, and also of determining whether or no all of the openings possibly made into the viscera have been sutured.

The most recent statistics of the results of operations for stab wounds of the abdomen (Gaston's tables) contain twenty-eight cases in which abdominal section was done, with sixteen recoveries; of this number, nineteen had wounds involving one or more of the viscera, and of these ten recovered and nine died. If it is known that a cutting instrument has entered the abdomen, the wounding of the viscera is to be assumed, yet "penetrating wounds of the abdomen without serious visceral injuries and without the presence of a septic foreign body in the abdominal cavity are frequently followed by recovery without resort to intra-abdominal treatment." In fact, in about 10 per cent of all penetrating wounds of the abdomen the viscera escape injury. This well-known truth that very many persons whose abdomens have been punctured by jagged, blunt, or sharp-pointed instruments have gotten well without surgical interference brings us to what may be considered the most important part of this subject, and that is: When it is uncertain what the extent of the injury may be, whether or no any viscus is wounded, we should reserve explorative measures for the determination and the repair of such injuries to the hands of a trained modern surgeon of experience in the practical workings of aseptic surgery. The services of such a man can always be had nowadays, or, circumstances possibly preventing, a young man who has been taught practically how to do intestinal surgery upon the human cadaver and living animals, and has acted as assistant in hospitals or private practice to men who do clean work in the strictest sense, should be called. The management of these grave cases should not be trusted to any others. It is rather amusing to read from time to time about abdominal surgery upon the battlefield Of course these effusions come from men who never saw a battle, except in prose, verse, or upon canvas. As the perfection of modern war implements has not yet done away with the saber and the bayonet, it is to be expected that incised and punctured wounds of the abdomen will be inflicted in future wars, and perhaps some of them come into our hands for treatment. For this reason the writer ventures to call attention to the opinions of his preceptor, one of our leading authorities in such matters, Dr. Wm. H. Forwood, United States Army Professor of Surgery in the Army Medical School. The opinions of the doctor refer more especially to gunshot wounds, but apply to the class under consideration just as well. He says in substance:

"Laparotomy for gunshot wounds of the abdominal viscera, unlike many other operations in military surgery, will always be greatly restricted in its application and usefulness by the very exacting conditions necessary to success. Wounds of the viscera do not admit of delay. There is no way to prevent sepsis, as in external wounds. The time that may elapse before an operation must be done is limited to from three to five hours, after which the chances of success diminish very rapidly.

"The operation must be done at the hospital, in a warm, quiet room, protected from wind and dust, with good lights, competent assistants, plenty of time, and the advantage of the strictest antiseptic precautions. Very exceptional qualifications are demanded of the surgeon. None but those having skill and special training in this line, and who have had considerable experience at least on the cadaver and on living animals, should dare undertake it. The mortality from laparotomy for gunshot and stab wounds of the intestines done by experienced operators will be much greater than that under the expectant plan of treatment. Except in siege operations, the hospitals will very rarely be established in time to offer the benefit of this operation to those wounded in the early part of an engagement. Very few of the severely wounded will be able to reach the hospital under ordinary circumstances within five hours after the receipt of their injuries. Men with penetrating wounds of the abdomen suffer from shock and hæmorrhage, and often have to remain for a time on the field, and they usually have to be carried long distances on litters. Such cases are brought to the hospital in the evening, or during the night, when the difficulty of operation is increased by want of proper light, or more frequently not until the following day, when it is too late. An operator with requisite skill and experience will rarely be available, and when there are many wounded, the services of two or three of the best surgeons for an hour or two of precious time can seldom be given to the doubtful benefit of one among a number of men urgently needing assistance. Battles result in defeat as well as in victory on one side or the other, and among the wounded prisoners the benefit of laparotomy will hardly be realized, although some antemortem abdominal sections may be made by well-meaning surgeons with more zeal than discretion. On the whole, the outlook for future operative interference in cases of penetrating wounds of the viscera on the battlefield is not very promising. But still there will be exceptional cases and especially favorable circumstances where this procedure may become practicable."

Fine iron-dyed silk and ordinary round sewing needles are the best material for closing wounds of the intestines, and if the wound

is over one centimeter in length we can use the continuous Lembert sutures, otherwise the interrupted. If there is no hurry, it is best to use a double row of sutures. If the trauma demands excision of any part of the gut, and if there is no great urgency, end to end anastomosis by suture is a good method —if the case is urgent a Murphy button may be employed. Blood-vessels may be tied with silk or catgut. Wounds of the liver should be sutured, or the wound of entrance may be tamponed; or if a through and through wound, an instrument such as a catherer may be passed through its track and a tampon of gauze drawn after it. Wounds of the spleen may be sutured or the cut surfaces compressed by a figure of 8 ligature drawn over the protruding ends of a threaded needle, passed at right angles across the wound, or the gland may be removed. Wounds of the kidneys should be drained by gauze packing through an incision in the loin, or it may be best to do a nephrectomy. Wounds of the bladder should be sutured and the abdominal cavity flushed and drained; indeed, flushing and draining of the abdomen is indicated after all operations for the repair of traumatisms of its contents.—West. Med. Rev.

The Ambulatory Treatment of Fractures.

By Charles L. Scudder, M. D.

By the ambulatory treatment of fractures of the lower extremity is understood a method of treatment which permits the immediate and continued use of the injured limb as a means of locomotion.

Orthopedic surgeons as early as 1878 conceived the idea of allowing a patient with a fracture of the thigh or of the leg to walk about by means of apparatus.

Thomas, of Liverpool, and Dowbrowski used the Thomas knee-splint in the treatment of fractures certainly as early as the year 1881 or 1882.

Krause,[1] a German surgeon, published in 1891 the first account of the treatment of fractures of the bones of the leg in walking patients. Krause demonstrated that plaster-of-Paris could be used as a splint in fractures of the leg and in transverse fractures of the thigh.

Korsch [2] in 1893 presented a paper to the German Surgical Congress demonstrating that compound fractures of the leg and fractures of the thigh may be treated with plaster-of-Paris splints and early use. Korsch makes extension in a high fracture by applying the plaster while traction is maintained by an assistant directly to the skin, snugly to the malleoli, the dorsum of the foot and the heel A padded ring is incorporated into the upper limit of the plaster splint around the thigh, which presses against the tuber-ischii and thus accomplishes counter-extension. Korsch's cases were treated in Bardeleben's clinic.

Bruns,[3] of Tübingen, in 1893 described a splint for use in these case of fracture of the leg and thigh.

Dollinger,[4] of Buda-Pesth, in 1893 described a splint for the ambulant treatment of fractures of both bones of the leg and reported three cases. Dollinger's method of applying the plaster-of-Paris splint is the one generally used whenever the ambulatory treatment is employed. The method will be described presently.

Warbasse,[5] at the Methodist Episcopal Hospital of Brooklyn, N. Y., in 1893, was the first in this country to systematically adopt Dollinger's method.

Warbasse reports six cases—all in young adults.

Bardeleben [6] reported in 1894 116 cases treated with walking splints. There were 89 fractures of the leg complicated and uncomplicated, five fractures of the patella, 22 fractures of the thigh, five of which were compound, three cases of osteotomy for genu valgum.

Bardeleben lays down the following law: It is of the greatest advantage to the patient that such a dressing can be applied to a broken leg that he can bear the weight of the body upon it and walk about; but such a method of treatment should be applied only under medical supervision, and with the most careful consideration of complications which might arise.

Korsch [7] presented to the German Surgical Congress in 1894 seven cases, three of the thigh and four of the leg.

Albers [8] in 1894 reported 78 cases (56 of the leg, five of the patella, 16 of the thigh, and one of the leg and thigh) treated by the ambulatory method. These are some of the observations made by him. He seems to be a little more cautious than other Germans in this matter. He says that when great pain is present it is best to employ injections of morphine. Elevation of the limb will often reduce the swelling; when this does not suffice the bandage must be removed. Severe local pain from pressure indicates the necessity for cutting a fenestrum. The first attempt at walking should be made on the day following the application of the cast. A crutch and cane are used at first; later two canes are employed; and, finally, some patients walk without any support at all.

1. Deutsche med. Woch., 1891, No. 13.
2. Berliner klin. Woch., No. 2.
3. Beiträge zur klin. Chirurgie, Bd. x, Heft 2, 18.
4. Centralblatt für Chirurgie, 1893, No. 46.
5. Transactions Brooklyn Surgical Society, October, 1894.
6. Verhand der Deutschen Gesellschaft für Chirurgie, XXIII Kongress, 1894.
7. Verhand der Deutschen Gesellschaft für Chirurgie, XXIII Kongres., 1894.
8. Ibid.

The report made by Albers upon fractures of the patella is so astonishing and so contrary to general experience here in Boston that I report what he says upon the subject:

In cases of fracture of the patella a plaster bandage is applied from the malleoli to within three inches of the tuber-ischii. This cast has a big fenestrum over the knee, through which the patella appears. For the protection of the fracture a strip of iron band, running three or four centimeters in front of knee, is incorporated in the plaster above and below. The fragments of the patella are drawn together with adhesive plaster. When there is not much fluid in the joint, the dressing is applied immediately. Otherwise, the fluid is drawn off by aspiration, and the limb treated on the Watson splint for a week. Five patients were thus treated by Albers, the separation representing one and a half to three and a half centimeters. From three to seven weeks were required in obtaining a firm union. All of the patients walked with this splint, and after its removal without support; and after a few weeks were able to bend the knee ninety degrees. The confinement in the hospital averaged fifty-two days. It would be instructive to know the subsequent history of these patella fractures.

Krause[9] in 1894 reported 72 cases treated He is of the opinion that the ambulant treatment in plaster splints must be limited principally to fractures and osteotomies in the region of the malleoli, the leg and the lower end of the thigh. He does not employ the method in the handling of oblique fractures of the femur and fractures of the neck of the same.

Bardeleben[10] writes again in 1895, reporting up to that date 181 cases treated by the ambulant method. This last report of course included the 116 cases of the previous record.

Dr. Edwin Martin before the Surgical Section of the College of Physicians of Philadelphia on December, 1895, reported 20 cases of fracture of the leg treated by this method.

Dr. E. S. Pilcher,[11] of Brooklyn, in whose wards Warbasse worked, reported to the American Surgical Association the 20 or more cases treated by him in which the results were satisfactory.

N. P. Dandridge [12] of Cincinnati has used the method in eight cases. In most of the case pain was complained of when weight was borne on the foot. In a feeble woman it was necessary to remove the cast in the third week. In the case of a man—a compound fracture of the leg—after walking two weeks he had so much pain that the plaster was removed. Redness and swelling were great at the seat of the fracture, and there was much swelling over the internal malleolus.

Woodbury[13] introduced the method at Roosvelt Hospital, New York City, and Fiske has reported cases treated at that clinic which were vouched for by Hartley of New York.

Roberts [14] of Philadelphia and George Woolsey[15] of New York have used the method in selected cases with satisfaction.

A. T. Cabot [16] of Boston has used recently in several fractures of the femur Taylor's long hip-splint.

E. H. Bradford[17] of Boston has treated cases of fracture at the Children's Hospital by a modified Thomas knee-splint, combined with and without plaster-of-Paris splinting.

The method of application of the plaster splint in the ambulatory treatment of fractures of the tibia and fibula or fibula alone is as follows (this is practically the method of Dollinger):

First the reduction of the fracture and cleansing of the skin of the leg with soap and water. Then with the foot fixed at a right angle to the leg, a flannel bandage is smoothly and evenly applied from the toes to just above the knee. This bandage is made to include beneath the sole of the foot a padding of ten or fifteen layers of cotton wadding, making a pad about three-fourths of an inch thick, when it is compressed by the moderate pressure of the flannel bandage. Over this is now applied the plaster bandage from the base of the toes to just above the knee, especial care being taken that the application is made smoothly and somewhat more firmly than is the custom in the ordinary plaster cast. The layers of the bandage should be well rubbed as it is applied, with the view of obtaining the greatest amount of firmness with the smallest amount of material. The sole is strengthened by incorporating in with the circular turns an extra thickness composed of ten or twelve layers of bandage well rubbed together, and extending longitudinally along the sole. The bandage is applied especially firmly about the enlarged upper end of the tibia, and here it is made somewhat thicker. As it dries it may be pressed in so as to conform more closely to the leg just below the heads of the tibia and fibula. The assistant, who stands at the foot of the table and supports the leg, makes such traction or pressure as is required to keep the fragments in proper position while the plaster is being applied. The operation requires about twenty minutes, and by the time the last bandage is applied the cast should be fairly hard.

It is seen that when this cast has become hardened the leg is suspended. When the pa-

9. Verhandlungen der Deutschen Gesellschaft für Chirurgie, XXIII Kongress, 1894.
10. Ibid.
11. Transactions American Surgical Association, vol. xiv, 1896.
12. Ibid.
13. New York Medical Record, 1897.
14. Transactions American Surgical Association, xiv, 1896.
15. New York Medical Record, 1897.
16. Ibid. 17. Ibid.

tient steps upon the sole of the plaster cast the thickness of the cotton beneath the foot separates the sole of the foot so far from the sole of the cast that the foot hangs suspended in its plaster shoe. Thus the weight of the body which would come upon the foot is borne by the diverging surfaces of the leg above the ankle. The chief of these is the strong head of the tibia. A lesser role is played by the head of the fibula, and the tapering calf in muscular subjects.

In thigh fractures the use of the long Taylor hip-splint, together with a high sole upon the well foot, and crutches is generally accepted as the best method of treatment.

Those advocating this treatment suggest its application to fractures of the leg below the knee, both simple and compound, and in fractures of the lower end of the femur.

The apparatus is not to be appiled for three or four days if there is much primary swelling. Great care is to be exercised in the continuance of its use, regard being had to œdema of the toes and pain.

The advantages claimed for the ambulatory method are:

The time spent by the patient in the hospital is less than by other methods.

Union in the fracture occurs at an earlier date.

There is less atrophy of the muscles of the thigh and leg.

There is less stiffness of neighboring joints.

The muscular weakness is less.

The functional usefulness of the whole leg is greater.

The primary swelling associated with a fracture is often avoided, and always less than by the older methods.

The secondary œdema is much less.

The amount of the callus is less.

In drunkards and those with a tendency to delirum tremens this liability is greatly diminished

In old people the danger of a hypostatic pneumonia is lessened

There is greater general comfort by this method than by any other. The general health is conserved; whereas by the old method the appetite is variable, sleep is troubled, the bowels are constipated, and general discomfort prevails.

Time is saved to the business man by this method—he having to give up but about seven days to a fracture of the leg.

These are the advantages claimed for the ambulatory treatment by its advocates.

All of the facts regarding the ambulatory treatment of fractures of the lower extremity are herewith presented. I have purposely avoided relating the details of each man's experience because those who are interested may consult the original articles from the references here given; such details are not particularly instructive, consisting chiefly of the accounts of modifications of apparatus.

Before this method can be adopted generally and in hospital treatment it must be demonstrated that it is safe and that it offers chances of better functional results than are obtained under present methods, and that the minor advantages claimed for it by ardent German advocates are real and not imaginary.

The first great advantage of the method is stated to be that the stay in the hospital and the time away from one's occupation are much lessened. Regarding this point I have had, through the interest of Dr. Washburn (former house surgeon at the Massachusetts General Hospital, three series of cases examined.

The Massachusetts General Hospital surgical records were consulted at these periods:

(1) Before the use of the plaster-of-Paris, that is, previous to 1865.

(2) Just at the beginning of the use of plaster-of-Paris as a splint for fracture.

(3) In 1895, 1896 and 1897.

Thirty-five cases of fracture of the tibia and fibula were tabulated from each period; these were unselected cases.

The duration of the average time spent in the hospital in the first period was 46 days; in the second period it was 45 days; at the present time it is 16 days. In the second period plasters were applied to fractured legs on an average at about the twenty-eighth day; at the present time on the fourteenth day. In other words, there has been since the introduction of the plaster splint a gradually shorter detention in the hospital, as the surgeons have come to recognize the safety of an earlier application of a fixed dressing. On an average, patients with fracture of the leg are detained in the hospital to-day but 16 days. The very great saving to the hospital in time by the ambulatory treatment does not therefore appear.

I imagine that at the Boston City Hospital, where it is the safe and invariable custom to split laterally the plaster splint before discharging the patient from the ward, the duration of the time spent in the hospital may average a little less than the time stated above.

It is impossible to consider the statements made with regard to rapidity of healing, sign of callus, absence of muscular atrophy and absence of rigidity of joints, because there are no facts available for the purpose.

The advantages stated are based, most of them, upon the personal impressions of the surgeon in charge; such observations are untrustworthy.

Krause presents a table from Paul Bruns containing the average periods of healing in a series of fractures, and he compares these periods with his own fracture cases, treated by the ambulant method. This is the only attempted scientific statement of observation on

this important point. Krause concludes from a study of these tables that, "in the treatment of fractures of the middle and upper thirds of the leg, the ambulant method shows a great advantage in the period of consolidation as well as in the time when the patient can return to work It seems that the higher up the fracture is in the leg the sooner a cure is effected by the ambulant method of treatment."

In reviewing carefully the literature I am unable to discover any advantage in the results of the ambulatory treatment over the present modern treatment of fractures of the leg.

The present commonly accepted method of treating uncomplicated fractures of the leg by allowing the initial swelling to subside, by the application of a plaster-of-Paris splint, later by the splitting of this plaster splint and reapplying it with a retentive bandage, by permitting the patient to be up and about on crutches and the well leg at the end of two weeks, by the subsequent removal of the plaster splint; by passive and active motion and massage to the knee and ankle joints; by the gradual bearing of all the weight upon the fractured bone,—this roughly outlined present treatment is satisfactory.

The present commonly accepted method of treating fractures of the femur by long rest in the horizontal position, with extension by weight and pulley, is not satisfactory. The protracted stay in bed is undesirable. The use of the Taylor hip-splint in the treatment of this fracture, assisted by co-aptation splints or plaster-of-Paris is of distinct value.

Two fundamental principles in the treatment of fractures must be constantly in mind when new methods are being discussed, namely the reduction and the absolute immobilization of the fractured bone.

Theoretically and practically the ambulatory treatment does not perfectly immobilize; therefore I believe it cannot preëminently succeed as a means of treatment. However, in certain carefully selected cases of fracture below the knee, particularly of the fibula, if under the care of a competent and skilful surgeon, it is possible to conceive of the ambulatory method being used without doing harm.

The method in general seems to me to be unsurgical. Embolism, both of fat and of blood, and the likelihood of pressure sores in the use of the plaster splint are dangers to be considered. It is wise for the injured limb to rest while the reparative process is commencing. Muscular relaxation is desirable in the treatment of fractures. The very admission by the advocates of the ambulatory treatment that muscular contractions take place is reason enough for supposing that complete immobilization is not obtained by this method.

A consideration of the ambulatory treatment of fractures will have served a positive good if it shall lead to a more careful use of the plaster-of-Paris splint in fractures of the leg and to a proper application of the long hip-splint or its equivalent in fractures of the thigh, and to the early use of crutches and the high sole on the well foot in both of these lesions.—Boston M. and S. Journal.

Ziegler has been making a careful study of perforating punctured and gunshot wounds of the abdomen, as presented in the University Clinic of Munich, and reaches practically the same conclusions as those of Dalton, Marks and others who faithfully watched such cases in the great city hospital of St. Louis, viz.: As in most cases of stab wounds or gunshot wounds of the abdomen, it is impossible to determine from the symptoms whether or not perforation has occurred, immediate surgical intervention is the wisest course to pursue. This general rule has been adopted in the clinic of the University of Munich with brilliant results. Seven gunshot wounds were thus treated, with a mortality of 59 per cent, and twenty-two stab wounds, with a mortality of 18.1 per cent, the latter being a very favorable comparison with a series of thirty cases treated conservatively from 1876 to 1890, with a mortality of 46.6 per cent. As to the technic, no matter where the wound may be, it is wiser to open the abdominal cavity by a median incision. The dexterity with which the operation is performed influences greatly the prognosis, and no time should be lost in performing complete resections, the wound being closed by simply invaginating the torn edges of the wound. When the hæmorrhage is uncontrollable and the bleeding point difficult to reach, evisceration is practiced; if the bleeding follow a wound of the liver or the spleen, it is better to suture than to tampon the wound. When the diaphragm is injured, though the wound be more easily reached through the thoracic route, it is better surgery to perform celiotomy, making the incision parallel to the border of the ribs, as in so doing the gut can be carefully examined and any complicating wounds be sutured.

After operations on the face or mouth in children, or in any condition in which it is desirable to prevent the child from carrying its hands to its face, extend the arms and keep them extended by a few turns of plaster of Paris bandage around the elbow-joint.—Int. J. Surg.

In skin suture use only as many stitches as are necessary to secure perfect approximation; multiplicity of sutures leads to more visible scars, wastes time, and rather interferes with repair than promotes it.—Int. J. Surg.

THE Railway Surgeon

VOL. V. CHICAGO, JULY 12, 1898. No. 4.

INTERNATIONAL ASSOCIATION OF RAILWAY SURGEONS.

MINUTES OF THE ELEVENTH ANNUAL MEETING.

The association met in the assembly hall of the Department of Education, St. James' Square. and was called to order at 10:40 a. m. by the chairman of the Committee of Arrangements, Surgeon Bruce L. Riordan of Toronto, who introduced the president of the association, Dr. Geo. Ross of Richmond, Va.

Divine blessing was then invoked by the Rev. W. J. McCaughan.

The next thing in order was the reading of the minutes of the previous meeting by the secretary, Dr. Mitchell.

On motion of Dr. Bouffleur, the reading of the minutes was dispensed with.

Dr. Bouffleur read the report of the Executive Board:

REPORT OF EXECUTIVE BOARD.

As the new constitution and by-laws adopted at our last meeting in Chicago placed the responsibility of fixing the salaries of the officers and arranging for the publication of the convention proceedings upon the Executive Board, a meeting of that body was held on the last day of the Chicago convention.

The attention of a number of the members of the Executive Board had been called by numerous members of the association to the fact that the administration of the affairs of the Association was very expensive for an institution of this character. This seemingly general impression, coupled with the fact that the reports of the treasurer showed that we were practically without funds at each annual meeting, notwithstanding the fact that the local Committee of Arrangements for three successive years (twice in Chicago and once in St. Louis) had voluntarily assumed considerable of the legitimate expense of the association, convinced your board that the very life of the association demanded the curtailment of expenses in all practicable directions. To that end it was voted that the Executive Board should serve for this year without any allowance for postage or traveling expenses.

The salary of the secretary was fixed at $300, with allowance for postage. Not knowing how many members we would have this year, your board deemed it best to adopt the plan followed so satisfactory by many medical societies of placing the salary of the treasurer at 10 per cent of the fees collected, with allowances for postage and stationery. The officers-elect were advised of the action of the Executive Board before they were installed for the coming year.

The publication of the journal of the association, etc., was left to a committee consisting of ex-presidents Outten and Murphy, and the chairman of the Executive Board. The committee subsequently arranged with Mr. H. P. Robinson of The Railway Age and Northwestern Railroader to continue the publication of The Railway Surgeon on practically the same terms as theretofore.

The second meeting of the board was held in Chicago January 23, 1898, for the purpose of deciding upon the date for this meeting and to consider certain business matters relating to the affairs of the association.

In deference to the wishes of the publishers of The Railway Surgeon, who had hoped to be able to publish a Daily Railway Surgeon during this session, the board, after consultation with Dr. Riordan, who had been invited to be present, decided upon July 6, 7 and 8 as the dates of this convention.

The present financial and membership status of the association is certainly very encouraging. On May 1, 1897, your treasurer reported a balance on hand of $223.68, but as there were outstanding obligations of $185 at that date, there was an actual cash balance of only $38.68. From May 1, 1897, to May 31, 1898, 758 members registered for 1897-98, and

134 for 1898-99, the fees therefrom amounting to $4,460. During the year I have countersigned orders on the treasurer amounting to $185 on account of year 1896-97, and $547.88 on account of expenses for 1897-98, which, with the $2,664 paid to The Railway Age, as per contract, makes a total expenditure upon orders of $3,396.88 during the year. This amount deducted from the total cash leaves a balance of $1,286.80 on hand May 31, 1898. From this amount there should be deducted the following outstanding obligations.

1. Bills payable account 1897-98, which have since been vouchered, $155.15. 2. Due E. R. Lewis, salary as treasurer, in accordance with action of Executive Board, $444. Total obligations, $599.15.

Deducting this amount will leave a net cash balance of $687.65 in the treasury.

It is indeed a pleasure to be able to report to you that for the first time in four years we have a substantial balance to our credit in the treasury. A detailed statement is attached hereto.

In closing this report I desire to thank the members of the association and of the executive board for the confidence reposed in me and for the support the latter have given me in my efforts to administer the duties of this office in accordance with the provisions of our constitution and the expressed wishes of the board.

Respectfully submitted,

A. I. BOUFFLEUR,
Chairman Executive Board.

FINANCIAL STATEMENT OF THE INTERNATIONAL ASSOCIATION RAILWAY SURGEONS.

May 1, 1897, to May 31, 1898.

May 1, 1897, cash in treasury..		$ 223.68
RECEIPTS.		
758 membership fees (1896-97)..	$3,790.00	
134 membership fees (1897-98)..	670.00	4,460.00
Total cash....		$4,683.68
DISBURSEMENTS.		
E. R. Lewis, treasurer, balance salary 1896-97.. .....$	125.00	
C. D. Wescott, secretary, balance salary 1896-97.....	50.00	
Account Railway Surgeon (888 members).....	2,664.00	
L. J. Mitchell, secretary, salary	300.00	
Stationery	204.63	
Postage	183.40	
Fees refunded (5).....	25.00	
Total disbursements....		$3,552.03
Cash in treasury on June 1....		$1,131.65
To E. R. Lewis there is due for salary as treasurer in accordance with action of Executive Board (10 per cent. of fees collected).....		$ 446.00
Leaving a net balance in treasury of.....		$ 685.65
At the meeting of the Executive Board held during the Toronto meeting, an allowance of $347 was made to E. R. Lewis, treasurer, for stenographer's services during year 1897-98.....		$ 347.00
Leaving a net cash balance in treasury June 1, 1898, of		$ 338.65

The treasurer, Dr. E. R. Lewis, read his report, which was referred to the Executive Board to be audited:

"The books of the treasurer since last meeting, having been audited by the annual Auditing Committee, cover a period of fourteen (14) months. This is owing to the fact that last year we met one month before the close of the fiscal year and now we are in session one month after the close of the fiscal year. During this time 886 registrations have been made, 134 of which, by order of the Executive Board, registering since April, are credited on the present year. During June, 1898, we registered 313; with the 134 registered before the first of June for this year, makes 447 registering for the coming year to July, 1898, or a total of 1,199 registering since closing the books of 1897, to July 1, 1898—447—repeating.

"Our membership continues to represent Canada, Old Mexico and the United States, Canada having increased her membership since our last meeting 45. Members registering during April and May, 134 in number, are credited with this year's dues by order of the Executive Board, thus cutting us short of 59 of previous year, which shortage would more than have been covered had we credited the year with its deserts, as compared with previous years.

"Since the beginning of the present year, 1898-99, four hundred and forty-seven (447) registered before I left home, July 3, thus making the best beginning of any year since I have been acting treasurer.

"Notwithstanding the humanitarian war our states are to-day engaged in, our members are without exception still deeply interested in our philanthropic work, and the large increase in our Canadian membership insures

our continued proud position as the strongest surgical organization in the world to-day known to the undersigned.

"Four years ago when I was elected treasurer our indebtedness was about $500. To-day, July 1, we have in the treasury about $833.65, with but few bills to be deducted. This condition has been brought about not only by the strictest economy, but by generous aid in the matter of our collections on the part of our local bank, that has saved us annually not less than $100, so in the four years their kindness in this direction amounts to more than $400, as no charge has been made against the association for this work, which was a heavy annual drain on us always before. I here submit manifold copies of quarterly reports made to Executive Board, with number of vouchers attached, which is a complete statement (monthly) of the exact financial condition of the association, which I read verbatim if so desired.

"In conclusion I would say the treasurer has paid out (within $16.00) the entire amount for clerical and stenographic work allowed by the Executive Board. The daily correspondence during the year has been tremendous."

Dr. Riordan made several announcements on behalf of the Committee of Arrangements.

Dr. Louis J. Mitchell of Chicago read his report as secretary of the association:

"The duties of the secretary during the past year have consisted, as in former years, of signing the certificates of membership and vouchers drawn on the treasurer, besides conducting a large amount of correspondence. Some 520 letters were received and 1,540 sent out. As the secretary is a member of the Committee of Arrangements this has required considerable correspondence with the local members of the committee."

One meeting of the Executive Board was called for January 23, 1898, by the chairman, Dr. A. I. Bouffleur, at which the date of this meeting was agreed on and some other business transacted.

There being no miscellaneous or other business to come before the association at this time, the reading of papers was proceeded with.

The first paper on the programme, by Mr. E. L. Rich of Boston, entitled "The Claims Department of Our Eastern Railroads and Its Relation to Medical Organizations," was passed in the absence of the author.

Dr. G. P. Conn of Concord, N. H., read a paper entitled, "Physical Examination of Railroad Employes and Its Medico-Legal Significance," which was discussed by Drs. Getz, Hoy, Guthrie, Curry, Letcher, Pepler, Hungate, Middleton, Dodson, and the discussion closed by Dr. Conn.

On motion the association adjourned until afternoon session.

The association reassembled at 2:30 p. m. and was called to order by the president.

The secretary read the minutes of the previous session, which were approved.

Several applicants for membership were proposed and referred to the Nominating Committee.

The president announced the following committees:

Nominating Committee—S. C. Benedict, chairman, Georgia; B. L. Riordan, Ontario; G. P. Conn, New Hampshire; W. D. Middleton, Ia.; Hugh M. Taylor, Virginia; R. E. L. Kincaid, Texas.

Committee on Necrology—James H. Letcher, Kentucky; Thomas T. Earle, South Carolina; J. G. Brodnax, North Carolina.

Judiciary Committee—H. L. Getz, chairman, Iowa; C. W. P. Brock, Virginia; L. Keller, Ohio; W. S. Hoy, Ohio; S. R. Miller, Tennessee; W. B. Outten, Missouri; A. I. Bouffleur, Illinois; B. Thompson, Iowa; F. C. Vandervort, Illinois; H. P. Merrill, Maine; W. J. Hilliard, North Carolina; John L. Eddy, New York; C. Plumbe, Nebraska; R. L. Bocock, Alabama; T. L. McCarthy, Kansas.

The first vice-president, Dr. J. Alex. Hutchison of Montreal, then took the chair and President Ross delivered his annual address.

Gentlemen:—By virtue of your gracious and too partial courtesy, I am privileged to make my bow before you, following the lines of established precedent by the reading of an address.

Its first utterance must be the expression of my grateful and profound sense of the honor you have conferred upon me in my election to the office of president—the first president of the association as an international body. I need surely add no promise to discharge the duties appertaining to the office.

We are assembled in this beautiful and his-

toric city, as representative men from the three divisions of our great North American continent. When I stand in the door of my distant home on the banks of the James, in Virginia—the Old Dominion—scanning the eastern horizon toward Europe—the ancestral home of us all—visions of past traditions, linking the old world with the new, are blended with pictures painting our common interest in the present. Behind me is Mexico, the home of the sons of the Spaniard (alas! at this moment the enemies of my own country), to whose daring and enterprise we owe the very discovery of the land we inhabit, while to my left is the Dominion of Canada, the dwelling place of my blood relations, the Anglo-Saxons, and the children of France, fast friends of my forefathers in the days of their greatest need and their staunchest ally.

Pondering these traditions of the olden time, how strong appears the tie between the Frenchman and the Spaniard. For ages scions of the same house sat on the thrones of both nations, while in both flows a current from that strong Latin source, whence a rill enriches our own Anglo-Saxon blood. Nor is this all, for it is within the possibilities that in the veins of not a few in this assembly flows a tide from the aborigines of this vast land. May there not be Mexicans here boasting descent from the true and gentle Montezuma and his courtiers? Is there no Canadian here proud of an ancestor in a brave and noble chieftain of some powerful northern nation, himself a king? I am of a race in whose ancestral line stands the lovely, brave and gentle princess—Pocahontas.

But, fascinating as traditions are, we cannot linger amid the memories of the past. Strong as were the chords wound and interwound about our forefathers, there is a cord about us, their descendants, now assembled in this hall, a bond, strong as the iron hand of human need and sombre-hued as the shadow of human woe, but gemmed with the dewdrops of human compassion, and brightened here and there with the rainbow hues of human hope. The courage, constancy and endurance of men of the olden time braced them for deeds of prowess and of conquest—anguish bearers they were to the foe. It is our part to hold fast to our inheritance of courage, constancy and endurance as relief bearers to the anguish of our fellow creatures.

We stand here a band of workers for the alleviation of the distress that often follows in the wake of those great annihilators of distance, those burden bearers of the world's traffic, the far-reaching, ever-expanding, interweaving and interlocking great railway systems of the three divisions of this continent, and by them we are made neighbors (though it is still more than an afternoon ride from the Thousand Islands to Mount Popocatepetl).

We gather as an International Association of Railway Surgeons, bearing not only the professional insignia bestowed upon us by definite, learned schools, accrediting us to the public for the practice of the healing art, but we are as well the selected servants of the great railway companies of the whole continent, honored by them with the special appellation, "Railway Surgeons." We hail from different sections of the one continental division, but speak practically one tongue.

In geographical location we are separate and apart, but in aim, in purpose, in hopes and in aspirations we are united, "Quam fluctus diversi, quam mare conjuncti—Distinct as the billows, yet one as the sea." It would be idle in such a gathering to bespeak harmony, good fellowship and mutual consideration in our deliberations. I am sure that the duties of your presiding officer will involve only the pleasant repression of zeal and earnestness in the discussions of the topics submitted to us and of the ways and means of advancing those interests that belong to our special domain.

That service is so varied and multiform that it is difficult to formulate its duties, or define it, except by the general term, "Emergency Service," a service at once characterized by the absence of fixed rules and definite methods. And because our members are drawn from such a large and varied extent of territory, representing different influences, habits of mind, modes of thought and surgical procedure, it is not unnatural that our discussions should have a wide range of thought, with an apparent want of continuity. Of this one thing, however, I am sure, a fraternal spirit will be the marked characteristic of our meeting, when each and all will play the role of instructor to others or, in other words, it will be a sort of Methodist experience meeting.

We are living in an age of marvels, and in no direction do we find more of them than in our own profession, marvels of scientific thought as well as the practical adaptation of means to scientific ends. The last quarter of a century has witnessed more marvelous developments in the basis of the healing art, in the scientific estimate and consideration of disease, and in the application of means to ends in its treatment, than has even been witnessed in the more practical relations of life.

The whole field of antisepsis is of such recent development and of such enormous reach in results that we must need stand almost appaled and, in wonder and amazement, ask, "What next?"

BRUCE L. RIORDAN, M. D., C. M., TORONTO, CAN.
President-elect I. A. R. S.—1898-99.

From the day that Jenner gave to the world his theory of vaccination and Morton shut the door of the operating room in the face of suffering under the surgeon's knife, by the discovery of ether as an anæsthetic, the whole field of our service has widened and deepened, grown clearer and more secure, until to-day the practitioner, whether of medicine or surgery, stands almost a wizard in the power of remedial treatment.

I need not remind you how the results of those engaged in scientific thought and investigation are, through the media of printing and illustrations in periodical journals, placed promptly at the command of the earnest student everywhere. Indeed, so thoroughly and so temptingly is this part of the newer development carried forward that we are no longer remitted to the necessity of waiting for the quarterly pages of popular old Braithwaite, large and important as was the field it so long and so ably filled, but the tendency to specialization, ever expanding, has called into existence journals devoted to special work, so that the reader, wherever he may be, can be in touch, not only with the ablest treatment devised or discovered, but by virtue of the photographic art, is in constant view, save in the point of personal presence, with the best attainable clinics.

Add to this facility for gaining knowledge the ease and readiness of professional intercommunication by rail, by telegraph, by telephone and by express, and the rural physician has accessible to his summons the ablest specialists in medicine or surgery to be had in the largest commercial centers, whether it be to illumine the dark places in his mind, lessen the burden of his personal responsiblity or to lend him the hand skilled in surgical technique.

Into this field of modern scientific development a wholly new power has been called into existence to supplement and aid the skill and learning of the surgeon. The fidelity, watchfulness and tenderness of the old-time nurse will be a pleasant memory alway, but in the march of progress her place has been supplied by those lovely handmaids of the surgeon, veritable white-winged angels at the bedside of suffering—the trained nurse. The confidence and calmness which her presence inspires in the sufferer and in the family, her unswerving obedience to instructions, and the confident reliance to be placed in the accuracy and record of her observations of every symptom presented during the intervals between the visits of the medical attendant, are of portentous moment when cast in the scale where the issues of life or death are so often weighed.

While I have thus alluded, in a somewhat cursory way, to some of the wonderful advances in our profession, to the conditions attending upon its practice, and to the aids it

finds in other branches of science, I have not touched upon the special advantages attending upon that branch of it in which we are most immediately interested, nor to the conditions which attach to a large part of the service we, as a body, are called upon to render.

We are "Railway Surgeons" and our mere summons to service carries with it the thought of a mighty and resistless mangling force. We hurry to the scene of accident, accoutred with medical and surgical appliances, to render immediate and needed succor.

The corporations we serve are alive to the possibilities, aye, the almost certainty of such occasional catastrophes, and they have wisely provided for them. Their first precaution has been the selection of a staff of surgeons, men of moral character, of resolute will and of accredited standing in the ranks of their profession. They have added to this first agent of relief thoroughly organized and equipped hospitals, hospitals owned and equipped by the individual companies, or, in their absence, hospitals already existing in the cities or towns permeated by the roads are availed of, and into these the wounded are carried and cared for.

But very much of the service to be rendered must be done by that class whom I may not inaptly designate the "Roadside Surgeon." He must needs be not only well trained in all that the schools have to teach him, but he must be quick in action, self-poised in temperament, heroic in mold and fertile in resource: An

"Ole Docteur Fiset an' his horse Faubourg,
Mus be le bon Dieu dat is help him t'roo."

Or, a very "Weelum" Maclure, a doctor of the old school, "ready, willing, untiring," abundant in that dexterity which adapts the facilities by which he may be surrounded, meager though they be, and poor in character, to the emergency which is upon him. He must do his work at the instant, with a deep sense of the responsibility that is upon him; not only that he may bring relief to the patient by the prompt exercise of his skill, as an act of mercy to a suffering fellow being, but because he has the honor of his profession and his own good name at stake. Besides, he is the guardian of the ultimate responsibility of the corporation which he serves.

Be it remembered, we have passed the day when the character of our surgical work may be determined by the judgment or opinion of others, whether friend who would shield our errors or competing rivals who would seek to smirch our fair fame. The X-ray has come to pierce the veil of flesh and to reveal the hidden things of life, making clear the exact facts and blotting out the possibilities of errors in opinion.

This, one of the later developments in the application of scientific methods and machinery to our needs, is one of the most marvelous in its importance, and marks a new era in surgical diagnosis. It would involve the power of divination to speak of the future of this discovery, for not even the imagination of those scientific wizards, Edison and Tesla, can compass the possibilities it has opened up to them as scientific workers, or to our profession in its relation to our work and its needs.

And now, in closing, I must speak for myself, and I believe I voice the feelings of the fellows of this association. I rejoice in the rechristening of our association so that it shall hereafter be known as an international association, an association catholic in its organization, beneficent in its design, conducive to an ever-expanding knowledge and a constant stimulus to a higher moral standard in professional thought and action.

I rejoice that this international body has convened in this beautiful city of Toronto, situate on the confines of two of the great nationalities composing our brotherhood, a city so famed for its enterprise, for its culture and for its charities. What city more fitting in which to summon the clans to meet for cementing the bonds that grow out of kinship and of blood?

And may I not with propriety add the earnest wish that the commercial bonds which are drawing us into closer and firmer relations will continue and strengthen until there shall be a fulfillment of the half prophetic declaration recently made by the Rt. Hon. Joseph Chamberlain, that "The signs of the times promise a complete solidification and unification in all the relations of life of all the English-speaking peoples." Nothing, surely, can be more conducive to an end so desirable as such gatherings as this, in a city extending such warm and cordial greetings as Toronto has extended to us.

The vice-president, in behalf of the association, thanked Dr. Ross for his able address.

Mr. B. B. Osler, Q. C., Counsel Grand Trunk Railway, delivered an address.

Dr. C. P. Gordon of Dalton, Ga., read a paper entitled, "General Anæsthesia by Chloroform or Ether. Which? Local Anæsthesia by Cocaine or Eucain. Which? General or Local Anæsthesia in Enucleation or Extirpation of the Globe of the Eye. Which?"

The discussion was opened by Dr. Fulton and continued by Drs. Elliott, Eddy, Bouffleur, White, Hoy, Thorn, Lutz, and the discussion closed by Dr. Gordon.

Dr. F. C. Vandervort of Bloomington, Ill., read a paper on "Fever and Fever State."

This paper was discussed by Drs. W. E. Guthrie, J. E. Epperson, and in closing by the essayist.

Dr. W. H. Coffey of Parksville, Mo., read a paper entitled, "Conservatism," which was discussed by Dr. Hoy, after which the association, on motion, adjourned until 8 p. m.

The association reassembled at 8 p. m. and was called to order by Dr. Riordan.

Dr. James Thorburn of Toronto was introduced and welcomed the association, on behalf of the medical profession, as follows:

Mr. President, Ladies and Gentlemen:—There may be something novel in what I have to say to you. At least, I think so, because I am going to be very brief. We are delighted to have you here in our Queen City, and I hope you will enjoy yourselves thoroughly to your hearts' content. We are proud of our city, of our institutions and hospitals, and our schools of learning. We are proud of our medical men and of our profession generally. (Applause.) We are happy to have you here in order that you may see what sort of people we are. After you have enjoyed your literary and scientific treats we hope you will take a little time to visit our northern lakes, a country almost unparalleled on the continent, and within three hours' run of the city; a country filled with lakes and studded with islands, covered with spruce and pine—health restorers. You will be surprised, ladies and gentlemen, to know how delightfully you can sleep, awake and sleep again, and get up with renewed vigor. There is no country in the world where the tired brain and exhausted frame can be resuscitated so readily and quickly. I am sure after you have once been there you will long to come back again. I hope your visit here will be one of continuous pleasure and enjoyment. Meetings of this kind create a kindly feeling between the two nationalties, and it will tend to promote the sentiment which is so universally expressed in this great empire, and, we hope, on the other side of the water, for an Anglo-American alliance. (Cheers and loud applause.)

Addresses of welcome were also delivered by John Shaw, Esq., mayor of Toronto, who spoke as follows:

Mr. President and Members:—I do not like to address a meeting of the International Association of Railway Surgeons, for the reason that I have been under a doctor's care for the past six days, and a horrible compound of Vichy water and milk has been the only sustenance I have been taking, and you cannot imagine how indifferent I feel toward giving you the kind of cordial welcome I would like to give you on behalf of the city of Toronto. (Laughter.) I do not like two or three doctors around; I like a whole lot of doctors, such as we have present here, with their wives, and I congratulate the city of Toronto on being honored by the presence of this convention this year. I hope you will return to your homes with a good opinion of Toronto and come back again as often as you can make it convenient. We shall be proud to see you and assist you in enjoying yourselves in every possible way. I hope your hosts will give you something stronger than I have been getting since I have been under the doctor's care. (Laughter and applause.)

You have to follow me the Hon. Mr. Ross, one of the most eloquent speakers in Canada, and I will not take up your time further than to say that I am most delighted to see before me this splendid array of gentlemen and ladies. The previous speaker, Dr. Thorburn, omitted any reference to the ladies. He thought Toronto ladies might not compare favorably with those you have brought with you. I want to say, however, we have nice, beautiful women in Toronto, and I believe they will compare favorably with your American women. (Applause.)

The last sentiment of the previous speaker was the Anglo-American alliance. That is in every man and woman's mouth in the city of

Toronto. We are heart and soul in sympathy with it, and our sympathies are strongly with you in the present war. (Hear, hear, and applause.)

I have nothing more to say, with the exception that I expect and hope to be with you on Saturday in your excursion to Muskoka. You will certainly see there a delightful place, and I am sure after your visit you will come back feeling better and stronger and be more inclined to view with greater favor the Canadians. The Canadians are your brothers and sisters, and we want to be that in the full enjoyment of every sense of that word. I thank you, ladies and gentlemen, for allowing me the privilege of saying a few words to you, and I regret exceedingly that my strength at present will not allow me to give you a heartier or stronger welcome. (Loud applause.)

Hon. G. W. Ross, LL. D., Minister of Education of the Province of Ontario, also welcomed the convention:

Ladies and Gentlemen:—Through the kindness of the chairman of the local Committee or Arrangements, Dr. Riordan, the agreeable task has been assigned to me of offering a word of welcome, on behalf of the Province of Ontario, presumably on behalf of Canadians generally, to the railway surgeons of Canada and the United States. (Applause.) Welcome is an easy word to articulate, but it is a hard word to say in such a cordial and suggestive manner as fully to express the thought that one sometimes means by it. If you can imagine to yourselves the pleasantest feeling you ever entertained in receiving a guest, and the pleasantest recollection you ever had of a guest—if you will consider all of these excellencies, then our words are summed up in the address of welcome which I will present to you to-night. (Applause.) We welcome you precisely in that way. We have a large country which you cannot reach, I venture to say, in your travels, but some time perhaps, when we have built a railroad to the Klondike, some American surgeon may have a professional duty or duties to perform while crossing some of our northern rivers. We bid you a large welcome—an Anglo-Saxon welcome—a welcome breathing all the feelings of hospitality and good-will which we can put into it. We are glad you are with us. We hope you will enjoy every moment of your stay. We welcome you because of the profession you represent. I believe in Canada we copy from all countries in the world every good point in their education we can appreciate. We have copied many good things from the United States in the matter of public and higher education, and not a few things in regard to college and university education. The surgeons represented here are specialists, are educated men. We are glad to welcome them in that sense. The prosperity of a country is maintained largely by the progressive character of its educational institutions, and we welcome you therefore, because you represent a progressive profession. There is in your profession a spirit of humanitarianism, a spirit which desires to do good to your fellowmen, to relieve suffering, to protect them against injury, and to alleviate their ills whenever they are afflicted. The medical profession in Canada—I must speak for it, not being a medical man, and knowing that the chairman of the Committee of Arrangements is so modest that he would not do so—is a progressive profession. It has established very eminent schools in this country. We educate medical men for our own land, and some of the more ambitious cross the line and seek honors in your land, and in some instances they find them. The medical profession in this country is a most generous profession. The attention which is given to sanitary legislation is commendable; it results in improving the sanitary condition of our towns and cities. Your profession take charge of our hospitals and charities, and in many instances without much remuneration, so far as the public are concerned, and they do a very generous work for the people of Canada. We welcome you because you represent a noble profession, and in the department of surgery which you represent you are distinguished for your skill. No matter whence you come, whether from the West, the East, the North or South, we welcome you to the city of Toronto. We welcome you as guests from abroad; we welcome you to this city because you are Americans—Anglo-Saxons of our kith and kin, of our own blood. You have inherited some of the great traditions which we as Canadians have inherited, and bearing aloft in a noble manner the heroic spirit which the Anglo-Saxon race has transmitted to this generation. (Applause.)

We have decorated this hall in recognition of the invitation extended to you as Americans. I never saw so many Stars and Stripes around this building before, and I have been here for a great many years. I never saw the Union Jack and the Stars and Stripes so closely intertwined. As a Canadian, I am glad of it. The Union Jack says to your standard —Old Glory, as you call it—in unmistakable language, "Let there be no strife, I pray thee, between me and thee, or between my kinsmen and thy kinsmen, for we are brethren." (Loud applause.) That flag reiterates the words expressed by the Psalmist a great many years ago, "Behold how good and how pleasant a thing it is for brethren to dwell together in unity." (Applause.) As Canadians we rejoice in this alliance, in those expressions of good-will which have passed between the two nations. The Atlantic Ocean may separate you from the old motherland, a land of chivalry, of song, of heroic men and heroic women, but it cannot separate those who have feelings of sympathy and kinship with each other. We recognize in the American republic a land that has made wonderful strides in the evolution of freedom, the first republic of the world to show that a large population is susceptible of the art of self-government. There were republics in olden times; they were small. Macaulay predicted fifty years ago that such a form of government would fall by its own weight. With courage and some of the old Saxon capacity for self-government, you have given the lie to Macaulay's prediction, and today the American republic is stronger in its forty-four states than it was in the earlier stages of its development. (Applause.) You have given to the world a magnificent record in literature, in oratory, in commerce, and in the accumulation of wealth. With giant strides you have settled a continent. I was picturing to my own mind a little while ago the suddenness with which this land was peopled. Only thirty or forty years ago you had but thirty million of people, but with one giant stride you settled between the Atlantic and Alleghenies; another stride, and you reached the Mississippi, and almost like a vision in the night, with another stride you reached the Rockies, and before the American republic was sixty years of age you actually occupied all of the land between the Atlantic and Pacific oceans. It is an achievement due to your enterprise, due to your great commercial activity. We recognize that power and welcome you as representatives of a great nation. We trust that on this northern side of the land there will be such evidences of similar enterprise before many decades have passed away, and that our young Canadians will accomplish, to a limited extent at least, something corresponding with which you have done on the southern side of the land. We recognize the courage with which you have struggled for the maintenance of your government. It is but a short time ago since you had a civil war, since the Union was rent by divisions. The clouds have rolled away; the Union was reestablished, and is a stronger Union to-day than ever it was. (Applause.) We recognize the statesmanship of men like Abraham Lincoln and your present president; we recognize the courage and resoluteness and ability with which you have entered upon this recent war for the redemption of Cuba (applause), a war to establish civilization and humanity. We have read the records of the stability and splendid courage which the American soldiers have shown in the hour of trial, and we know that they have within them that Anglo-Saxon pluck which won on the Plains of Waterloo and which has vindicated British honor under the hot sun of India. (Applause.) With such a people, do not be surprised that we recognize this spirit of Anglo-Saxon alliance —an Anglo-Saxon alliance, not for political purposes, but an Anglo-Saxon alliance for humanity's sake, for the sake of civilization, for the sake of preventing the development of tyranny and despotism, for the sake of lifting up poor, weak human nature to a higher plane of usefulness and enjoyment. Such an alliance is the one now under consideration; an alliance to protect the weak against the strong, to leave this world better than it was, and allowing these two flags to float in unison for such a purpose. (Applause.) Long may the Stars and Stripes proclaim to the world that free-born citizens are capable of evolving institutions which intensify and strengthen bonds of freedom. Long may our old Union Jack proclaim to the nations of the world likewise, that its purpose is to strengthen the bonds of freedom and preserve peace, as far as possible, among the nations of the world. (Loud ap-

plause.) These two flags, thus floating with this purpose in view, will deepen the powers of our common Christianity, will widen the bonds of freedom, strengthen the privileges of civilization and hasten the day, whose advent we may not see, but which must come by and by, when,

"The war drum throbs no longer, and the battle flag is furled
In the Parliament of Man and the Federation of the World."

(Loud cheers.)

I welcome you as Canadians, as Americans, as professional men. You can have access to the freedom of this land; we can give you the protection of our police, and immunity from the cutom-house officers if you do not smuggle in any foreign goods. (Laughter.) You have the freedom of our trolley system, if you pay your fare, and all such other privileges as are necessary for a man's comfort and happiness, and I hope you will enjoy every hour of your stay. (Loud and prolonged applause.)

President Ross responded to these addresses in behalf of the association:

Ladies and Gentlemen:—In the name of every member of the International Association of Railway Surgeons present and absent, I thank you for your cordial welcome to Toronto and for the graceful words in which you have been pleased to portray the fame of this beautiful city, notably as blending in happy union a people famous for hospitality, famous for recognizing and reverencing all that is good, and which is as familiar to us as household words. You enjoy the enviable reputation of being the most church-going people on this continent (laughter), and to be privileged to breathe the same air with such a people must surely be an inspiration to us. We have come to see for ourselves the things of which we have heard, and are prepared to cry out as did the Queen of Sheba in olden times, "Half has not been told to us." We are a band of brothers seeking rest from the monotony of tread-mill life. Men engaged in the earnest pursuit of the study of law and of philosophy seek mental rest in light literature, reading still, yet resting. We have put away for the time our carriages and horses and bicycles, and reveling in the lightning-like speed of the steam horse, have sped away from our distant homes, over mountains and through valleys, fascinated by the beauties of the ever-changing panorama of nature, to come to the Queen City of Toronto to find rest in a change of work. We are health-seekers; we are in search of knowledge of how best to alleviate the sufferings of our fellowmen; we are seeking knowledge of how best to discharge the duties that we owe the great railway companies of this whole continent. We have met for the interchange of personal experiences in the council chamber; to reap benefit from advances made and from knowledge gathered and garnished through many years of earnest effort in many fields of labor; to have men of all ages give their experience in the debate of mooted questions, remembering always that brightness is born of attrition. We are glad to be in this city of Toronto to enjoy all that is here to be seen. We are glad to have the privilege of hearing the distinguished gentlemen who have spoken and so cordially greeted us. I only regret that dame nature did not impart to me the splendid gift of oratory, which my kinsman, certainly by name, for I am George Ross, possesses. I feel exceedingly jealous of his great gifts, but I congratulate the people of the Province of Ontario that they have such a fine example of oratorical power in their community. I shall carry home with me a most vivid and delightful recollection of this gathering and of the reception which we have had. It is delightful to have been here, and again I thank you, on behalf of the association, for this cordial reception. (Applause.)

JULY 7—SECOND DAY—MORNING SESSION.

The association met at 10 a. m. and was called to order by the president.

The following papers were read:

1. "Nature and Pathology of Shock," by Dr. F. J. Lutz of St. Louis, Mo.

2. "Pathology of Railway Shock," by Dr. Wyatt Johnston of Montreal.

3. "The Varieties and Causes of Shock," by H. L. Getz of Marshalltown, Iowa.

4. "The Prevention and Treatment of Shock," by Dr. James H. Letcher of Henderson, Ky.

5. "Symptomatology, Diagnosis and Prognosis of Shock," by Dr. S. R. Miller, Knoxville, Tenn.

6. "Is Shock a Predisposing Cause for the

Development of Consumption?" by Dr. J. G. Tuten of Jessup, Ga.

On motion of Dr. Outten the general discussion on these papers was postponed until the afternoon session.

Sir Wm. Hingston was introduced to the association by the president and thanked the association for having honored Canada, and particularly Toronto, with their presence.

Adjourned until 2 p. m.

The association reassembled at 2 p. m. and was called to order by the president.

The discussion of the several papers on Shock was opened by Dr. Outten and continued by Drs. Hingston, Taylor, McOscar, Fulton, Jay, Trigg, Elliott, Moore, Conn, Eddy, Girdwood, Lutz, Getz, Letcher, Budd, McCullock, after which the discussion, on motion of Dr. Brock, was closed.

Dr. Brock moved that The Railway Surgeon publish all of the papers and discussions on Shock in pamphlet form, and that a copy of the same be distributed to every member. Seconded.

Dr. Bouffleur called attention to this as being an unnecessary expense, whereupon Dr. Getz moved, as an amendment, that the symposium on Shock be published in one issue of The Railway Surgeon as the sense of the convention. Carried.

Dr. A. I. Bouffleur of Chicago then read a paper entitled "Cerebral Contusions," which was discussed by Drs. Getz, Outten, Elliott, and the discussion closed by Dr. Bouffleur.

Dr. Francis B. Fite of Muskogee, I. T., read a paper on "Surgery of Tendons in Infected Regions," which was discussed by Drs. Ross, Bouffleur, Jay, and in closing by Dr. Fite.

On motion, the association adjourned until 9 a. m. Friday.

JULY 8—THIRD DAY—MORNING SESSION.

The association met at 9 a. m. and was called to order by the president.

Dr. A. L. Fulton of Kansas City, Mo., read a paper entitled, "The Pelvic Brain in Diseases of the Pelvic Organs," which was discussed by Dr. Milton Jay, and the discussion closed by Dr. Fulton.

Dr. C. F. Leslie of Clyde, Kan., read a paper entitled, "Report of a Case of Lightning Stroke, with Accompanying Fracture of Base of Skull."

This paper was discussed by Drs. Jay, Worship, Fulton and Hamilton.

On motion of Dr. Brock, the association proceeded with the nomination and election of president, treasurer and secretary. The result of the elections was: For president, Dr. Bruce L. Riordan of Toronto; treasurer, Dr. E. R. Lewis of Kansas City, Mo.; and secretary, Dr. Louis J. Mitchell of Chicago.

The secretary read the following resolution, offered by Dr. C. W. P. Brock:

Resolved, That we, the International Association of Railway Surgeons, desire to express our high appreciation of the cordial manner in which we have been received in the city of Toronto. We also desire to extend our sincere thanks to the various railway and navigation companies which have extended the courtesies of their lines to us, especially the Grand Trunk Railway, which has been so liberal and bountiful in caring for the wants of the association; to the newspapers of the city of Toronto and their representatives for the splendid reports of our proceedings; to the ladies of Toronto for making our stay so pleasant and agreeable. We wish particularly to express our thanks to Dr. Riordan, chairman of the Committee of Arrangements, and the gentlemen associated with him, for the perfection of arrangements for this annual meeting, and to the profession generally of the city of Toronto for the opportunities afforded us in looking into their educational institutions and hospitals, and to the citizens of Toronto generally for their uniform kindness and courtesy.

May we express the hope that this International Association may be the means of binding not only the profession, but the people of the Dominion of Canada and the United States in closer bonds of friendship, good-will and brotherly love.

The resolution was unanimously adopted.

Dr. S. C. Benedict, chairman, read the report of the Nominating Committee, as follows:

Report of the Nominating Committee.

Toronto, Canada, July 8, 1898.

To the Association:

The Nominating Committee beg to report that the following members have been chosen as vice-presidents:

Surgeon R. E. L. Kincaid, Bonham, Tex.

Surgeon James G. Hunt, Utica, N. Y.
Surgeon John L. Foxton, Huron, S. D.
Surgeon W. Gunn, Clinton, Ont.
Surgeon E. J. McKnight, Hartford, Conn.
Surgeon C. F. Leslie, Clyde, Kan.
Surgeon Hugh M. Taylor. Richmond, Va.

The following members have been chosen for the Executive Board:

Surgeon F. J. Lutz, St. Louis, Mo.

Surgeon James Alexander Hutchison, Montreal, Can.

Surgeon H. L. Getz, Marshalltown, Iowa.

As honorary members the following names were proposed:

E. St. John, V. P. and G. M., Seaboard Air Line, Portsmouth, Va.; V. E. McBee, Gen'l. Supt., Portsmouth, Va.; B. B. Osler, Q. C., Toronto, Can.; Edgar J. Ritch, Counsel Boston & Maine R. R., Boston, Mass.; L. S. Thorne, G. M., Texas Pacific; L. N. Martin, G. M., Iowa Central R. R.; Frank S. Gannon, G. M. and V. P., Southern R. R.; Sir William Van Horne, Canadian Pacific R. R., Montreal, Can.; W. H. Truesdale, Gen. Mgr. C. R. I. & P., Chicago.

Richmond, Va., is recommended as the place for the next annual meeting.

(Signed) SAML. C. BENEDICT,
Chairman.
BRUCE L. RIORDAN,
HUGH M. TAYLOR,
G. P. CONN,
R. E. L. KINCAID,
W. H. ELLIOTT,
W. D. MIDDLETON,
Nominating Committee.

On motion, the report of the Nominating Committee was adopted, with the exception of that part pertaining to the place of meeting, and it was referred to the Executive Board to decide between White Sulphur Springs, Va., and Richmond, Va.

Dr. A. I. Bouffleur, chairman of the Executive Board, reported that the board had carefully audited the books of the treasurer and had found the debits and credits therein neatly and correctly kept.

On motion, the report was adopted.

Dr. Lutz offered the following:

Resolved, That the treasurer of the association is hereby instructed to deposit all funds of the association now on hand, or that may be received hereafter, in the name of the association, and pay the same out only in accordance with the provision of our Constitution and By-laws.

Seconded and carried.

At this juncture the newly elected president, Dr. Riordan, was escorted to the platform. He was warmly received. He said:

Ladies and Gentlemen:—I thank you very heartily for the honor you have done me in electing me to the office of president of this association. While I appreciate the honor, I take it more as a compliment to my country and to the city of Toronto. (Applause.) It will be my endeavor while occupying this office to discharge the duties in a manner which will further the best interests of the association, and I assure you that I shall spare no exertion and labor to accomplish this. As my annual address will be inflicted upon you next year I have nothing more to say, except to again thank you for the distinguished honor you have conferred upon me. (Applause.)

Dr. Lutz moved that the treasurer be instructed to have published a list of the members of the association, together with their residence and the railroad which they represent. Seconded and carried.

Dr. S. S. Thorn moved that the secretary be instructed to send greetings to each member of the association who is now at the front. Seconded and carried.

The retiring president, Dr. Ross, thanked the association for the cordiality with which they had received him as president for this year. He also congratulated the association on the wisdom they had displayed in selecting Dr. Riordan as president for the ensuing year.

Dr. Keller moved that a vote of thanks be extended to the retiring president for the able manner in which he had presided over the sessions of the association.

Seconded and carried.

After three lusty cheers for Toronto, proposed by Dr. Brock, the association adjourned.

In children suffering from hernia, a very common symptom of strangulation consists in retention of urine; such retention occurring without known cause in children should always lead to the suspicion that a strangulated hernia exists, and it should be sought for.—Int. J. Surg.

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THE ANNUAL MEETING.

It was peculiarly appropriate that the first meeting of the "International" association should have been held in Toronto. The experiment of meeting outside the United States was very successful, so much so that it should be tried again at some future date. The meeting was a great success, both from the scientific and social standpoints, and the attendance was remarkably good considering the distance many of the members had to travel. Some of the familiar faces were absent owing to the exigencies of military duties, while others equally familiar were in attendance, as usual, and partially compensated for the absence of old comrades like Drs. Hoyt and Jackson.

The symposium on Shock was a great success also, as might have been anticipated from the personnel of the contributors. There seems to be no good reason why such a feature should not form part of the programme every year. The list of profitable subjects for consideration is practically unlimited—head injuries, penetrating wounds of the chest, of the abdomen, burns and scalds, anæsthetics, antiseptics, etc., would all yield as rich returns as the one on Shock has done. It is believed this discussion on Shock, which will be printed in our columns seriatim, will mark a new era in our understanding of this obscure condition.

The atmospheric conditions were simply perfect during the meeting. The weather sharp of Canada either is a much smarter man than the one here, or he has his weather under better control. At any rate the weather was delightful and could not have been improved on.

For the members visiting Toronto or Canada for the first time, some illusions were dispelled. One benighted old party was heard to remark, during the trolley party, that he did not think the Canadians looked like Indians at all. Possibly some others expected to see the Toronto streets filled with inhabitants wearing blankets and feathers in their hair. Neither the weather nor the people were "chilly," nor were any strange articles of diet set forth.

Much disappointment was expressed on account of the non-publication of the daily Railway Surgeon. The difficulties attending its publication, however, proved too great to be profitably overcome.

A very cordial invitation was received from Gov. Pingree of Michigan and Mayor Malsbury of Detroit to meet in the latter city. The Nominating Committee decided this was too close to the present place of meeting and chose Richmond, Va. Messrs. Parke, Davis & Co. endeavored to have the party visit their works at Detroit, but owing to the special train this feature had to be abandoned.

The Grand Trunk road, through Mr. Hays and Dr. Hutchison, proved a very Mæcenas of railways. Dr. Riordan's election as president was a slight recognition of his incessant labors on the Committee of Arrangements. Every member in attendance will always cherish bright memories of the beautiful "Queen City" and of the hospitality of its citizens.

Translations.

Direct Subcutaneous Ruptures of Large Arteries with Consecutive Gangrene.

By Felix Lejars.

(Continued from Page 35.)

CLINICAL STUDY.

The clinical phenomena may be divided into two groups: 1. In cases of immediate obliteration. 2. In cases of retarded obliteration.

1. Immediate Obliteration—The traumatism having been considerable the shock is frequently severe in the first few hours and may mask the local symptoms. In our case the patient was in a state of profound stupor, and this alarming condition lasted for many days. At the same time there was present a sort of local shock in the wounded member, obscuring the signs peculiar to the arterial lesion.

Among the signs of traumatic obliteration of arteries the following are the principal:

Absence of the pulse in the subjacent territory. In our case the absent radial pulse was the first thing to attract attention. It is hardly necessary to state that in all traumas of the limbs search for the pulse is one of the first and most important things to be done. In the upper limb the radial or ulnar should be looked for, then the bifurcation of the brachial at the elbow or the brachial itself. In the lower limb we search for the dorsalis pedis (which is often only to be found with difficulty), then the posterior tibial, the popliteal and the femoral. In cases which recover the arterial pulsations return slowly, at least in the large branches, and they are consequent on the establishment of the collateral circulation.

Paleness and Coldness of the Limb.—This is livid and quickly covered with bluish or violet patches; it is more marked at the extremity of the limb. When discoloration is less complete a good sign of circulatory arrest is the following: If we depress the skin with the finger the white spot thus produced, instead of immediately regaining its normal color, lasts for a long time or persists. The skin is cold and the difference between it and the sound limb is sensible to the touch. Of course it is appreciable to the thermometer, also, and there may be as much as 8-10 degrees difference.

Superficial and Deep Insensibility.—The zone of cutaneous anæsthesia is often somewhat irregular; its limits by no means correspond with those of the cold area. In Picou's patient (rupture and thrombosis of the popliteal artery), sensibility was abolished in all the zone innervated by the sciatic and maintained in that supplied by the internal saphenous. Thus the inner face of the left large toe was still sensible, while sensation was totally abolished in the other toes. In the second toe there seemed to be a small amount of sensibility, extremely obtuse in character and with a delay of several seconds in the perception of sensation and aberration of the tactile sense. We noted similar vagaries in our two patients. Moreover, the anæsthetized territory is susceptible of presenting certain variations of extent from one day to another during the initial period. These alternations of progress and of recoil prove the hesitation, as it were, in the collateral circulation.

Local State.—Examination of the wounded region will furnish useful information. The complete rupture and separation of the ends of the artery with the consequent easy occlusion suffices to explain why diffuse aneurism is far from being constant. We found but one example—a carriage wheel passed over the right hip and "an enormous swelling of the limb" was noted from the first "from the inferior third of the thigh to the ankle." Over 15 days later there was a rounded soft tumor in the lower part of the thigh, with slight pulsation. The toes were in a state of dry gangrene, as were also the exterior half of the dorsal face of the metatarsus and all the plantar region. After amputation of the thigh dissection showed the presence of an aneurismal sac as large as the head of a full-term child.

When the lesions are confined to the inner and middle tunics some blood always escapes about the artery, and sometimes forms an enormous hæmatoma. Its presence is explained by rupture of the trunks or sheaths of certain collaterals and attrition of the neighboring muscles. These vast effusions always forebode troublesome complications.

In a third series of cases local exploration is nearly negative. The most we can discover is a slight tumefaction at the apex of the wounded segment of the artery, a small hæmatoma, or an area of diffuse doughiness. "A short time after the accident," writes M. Ollier, "I noticed a hard and painful swelling along the length of the femoral artery due to the bloody effusion.

2. Retarded Obliteration.

Whenever the signs of arterial obliteration are slow in appearing, errors in diagnosis are possible. Hulke expressly notes that at first there was no sign of arterial lesion, and not until the third day was the forearm and arm swollen and strewn with red and green spots nearly to the shoulder.

Verneuil says the same. "A man received a contusion in the groin; at first the circulation in the leg kept up, and the phenomena of obliteration did not appear until 24 hours after.

(To be continued.)

Extracts and Abstracts.

Some Medico-Legal Questions in Personal Injury Cases.

By Clarence A. Lightner, Esq., of the Detroit Bar.

I need not dwell upon the importance to the medical profession of personal injury litigation. It has recently been stated that one-half of the actions at law tried in the courts of New York state are of this character.[1] Very few of these cases are tried without the aid of medical testimony. I propose to confine what I have to say to an important phase of this subject, which has received but little consideration from medical men.

The law does not give a right of action for every injury which may result from another's negligence. Negligence, to be the foundation for an action at law, must be the proximate cause of the injury. The maxim of the law is, "Causa proxima, sed non remota, spectatur" ("The proximate, but not the remote, cause is looked at"). The principle expressed in this phase is well understood; the application of it to the varying facts in litigation is most uncertain. There is, I believe, no legal proposition concerning which our courts differ so much as they do upon this one of proximate cause.

In personal injury cases this question is generally one involving medical knowledge, and it is, I am convinced, chiefly to the medical profession that we must look for aid in bringing to us both harmony and certainty in the law regarding this matter.

I wish to call your attention to the legal rules which have thus far been evolved, bearing upon the question of proximate cause and to interest you in the medico-legal phases, by referring to a few of the cases which best illustrate these rules. It must be understood that I am dealing only with personal injury cases in which defendant's negligence and plaintiff's freedom from negligence are proven.

The scope and meaning of our maxim are well explained by the Supreme Court of the United States as follows: "What is the proximate cause of an injury is not, ordinarily, a question of science or of legal knowledge. It is to be determined as a fact, in view of the circumstances of fact attending it."

"The primary cause may be the proximate cause of a disaster, though it may operate through successive instruments, as an article at the end of a chain may be moved by a force applied to the other end, that force being the proximate cause of the movement.

"The question always is, was there an unbroken connection between the wrongful act and the injury—a continuous operation? Did the facts constitute a continuous succession of events, so linked together as to make a natural whole, or was there some new and independent cause intervening between the wrong and the injury."[2]

The importance of this question is apparent in actions brought for causing death. This remedy depends upon statues which have been enacted in most of our states, and the action is brought by the next of kin of the deceased person or by his administrator, for the benefit of the next of kin. Of course the action fails, unless the wrongful act of the defendant proximately caused the death. The application of the rule we are considering is frequently difficult in these cases and the decisions do not seem to be wholly in harmony. The United States Supreme Court has held that death was not the proximate result of an injury received in a railway accident. In that case, the deceased received injuries which affected his brain and spine, inducing him, some eight months later, to commit suicide.[3]

On the other hand, in a Pennsylvania case, a shock due to the sudden starting of a street car caused premature child birth; tetanus ensued and death followed. These facts being explained by medical testimony, the jury was

1. 11 Hamilton & Godkin's "Legal Medicine," p. 377.

2. Milwaukee R. R. vs. Kellogg, 94 U. S., p. 474. See also, 19 Am. & Eng. Ency., Law p. 302.

3. Scheffer vs. R. R. Co., 105 U. S, 249.

permitted to find that death was caused, proximately, by the starting of the car.[4]

It does not seem to be necessary that death should result within any definite time, and the common law rule in homicide cases fixing a year and a day as the extreme limit, does not prevail in these cases. The injury seems to be far removed from the death in a New York case, where the knee cap of deceased was injured by his falling over a wire left by defendant across the street. An abscess formed; blood poisoning set in; gastritis ensued, and death occurred sixteen months after the fall. Defendant's negligence in leaving the wire across the street was decided to be the proximate cause of death.[5]

It is frequently claimed, on behalf of a defendant, that death resulted from unskilful treatment given deceased after the injury, and that, therefore, since death would not have resulted with proper care, the proximate cause of death was not defendant's negligence, but rather the negligent treatment. This contention has uniformly been rejected. The law says that if one who is injured by the negligence of another seeks, in good faith, medical aid, the one causing the original injury is liable for all the damage which may result.[6]

In New York state recently a passerby was injured, due to the neglect of the city of Troy to erect a barrier between the street and an excavation. Death resulted from a mistake of the physician who was called to attend her. It was held by the court that, if deceased in good faith and with reasonable diligence employed a physician to attend her, the city was liable for the death, though it would not have resulted with proper treatment.[7]

However, if death is caused by reason of the neglect of the injured person to care for himself, the act causing the original injury is not the proximate cause of death.

Yet the law does not require unusual care on the part of an injured person, and if the deceased took reasonable precautions for his health, the fact that he did not adopt the best remedies or that he did not follow explicitly his physician's directions, would not relieve the defendant of liability for resulting death.[8]

In a New York case the injured man refused to allow amputation of his leg, though so advised by his physician. The physician testified that amputation "would have improved his chances." The jury were instructed that if deceased was not negligent in rejecting the physician's advice, the negligence of defendant was the proximate cause of death.[9]

In cases where death does not ensue several other medico-legal questions arise, which bear upon the measure of damages to which plaintiff is entitled.

In the first place we must remember that in negligence cases the law provides only for compensatory damages to the injured person. Such damages may include any or all of the following elements: (1) plaintiff's necessary expenses; (2) his loss of time; (3) his diminished earning power; (4) his physical suffering, and (5) his mental suffering; so far as defendant's negligence has been the proximate cause of his damage in these particulars. There is no place, in such cases, for any award as damages beyond this.[10]

Now, it frequently happens that an injury which, if received by one in good health, would be trivial, by occurring to one having a tendency to disease or being in a weak physical condition, becomes quite serious in its results. In such a case is the proximate cause of plaintiff's serious illness, the negligence of defendant, or is it, rather, plaintiff's own feeble or unhealthy condition? Many cases show that, under such circumstances, defendant is liable for all of the damage resulting to the plaintiff.[11]

In a Wisconsin case a scrofulous boy fell upon a defective sidewalk and received an injury to his arm which resulted seriously. The defendant city claimed that the boy's injury was due chiefly to his previous physical condition. The court held, however, that the city was liable for all of the damage suffered by plaintiff, adding that sidewalks are intended for the use of the scrofulous, as well as of whole persons.[12]

In Maryland, one having a tendency to cancer was allowed to recover his entire damage against one whose negligence resulted in plaintiff's having cancer, though the consequence of the injury, if received by a well person, would not have been serious.[13]

However, it is well established that if a person has a disease which is aggravated by the negligent act of defendant he can recover damages only for the aggravation, i. e., for the difference between his condition before and after the injury. Such was the decision in a

4. Brasheer vs. Philadelphia Traction Co., 36 Atl. Rep. 914 (March 1897.)

See the following for similar cases:—Grima vs. Second Ave. R. Co., 8 Hun. (N. Y.) 491; Louisv. & N. R. Co. vs Jones 83 Ala. 376; Hurley vs. N. Y. & B. Ry. Co., 43 N. Y. Sup'l Rep. 259. (Jan. 1897.)

Also, the following cases, in which death did not ensue:—Bishop vs. St. Paul City Ry., 48 Minn. 26; Oliver vs. Lavalle, 36 Wis., 592.

5. Purcell vs. Laurer, 43 N. Y. Sup'l Rep. 988 (February 1897.); in this opinion, the earlier cases on proximate cause of death are discussed and the Scheffer case distinguished.

6. 16 Am. & Eng. Ency. Law, p. 441.

7. Caven vs. City of Troy, 44 N. Y. Sup'l Rep. 244. (March 1897.)

See, also, upon this proposition:—Nagel vs. Mo. Pac. Ry. Co., 75 Mo. 633; Sauter vs. N. Y. C. & H. R. R., 66 N. Y. 50; Thompson vs. L. & N. R. Co., 91 Ala. 496; Stover vs. Bluehill, 51 Me. 412.

8. Texas R. R. vs. Orr, 46 Ark. 182.

9. Sullivan vs. R. R. Co., 112 N. Y. 648.

10. 16 Am. & Eng. Ency. Law 477. Note, in 11 C. C. A. Rep. 558 and 9. Sherwood vs. Ry. Co., 82 Mich. 383.

11. 16 Am. & Eng. Ency. Law 443; 5 Am. & Eng. Ency. Law 43; Beauchamp vs. Saginaw Mining Co., 50 Mich. 163; Jeffersonville R. Co. vs. Riley, 39 Ind. 568.

12. Stewart vs. City Ripon, 38 Wis. 584. See, a similar case in Shumway vs. M'f'g. Co. 98 Mich. 412.

13. Baltimore R. Co. vs. Kemp, 61 Md. 74.

case where plaintiff, who was suffering from Bright's disease, was injured by defendant's negligence which resulted in an aggravation of the illness.[14]

With the advancement in medical science during recent years, the possibility of successfully feigning physical disease is slight, but in cases of mental distress or disease, when the symptoms are necessarily largely subjective, it is still possible, if not very simple, for dishonest plaintiffs to impose upon the courts. Our medical men may be advanced much beyond the knowledge and acumen of Thackeray's surgeon, who diagnosed a case of insanity because Barry Lyndon proclaimed himself to be Julius Cæsar and the doctor to be his affianced bride, Cleopatra. And yet they are by no means equal to the task of deciding, with any certainty, whether one who professes to be suffering from nervous disease has that illness or whether the disease, if genuine, resulted from a particular cause.

The intangible character of mental and nervous diseases and the difficulty of verifying their existence, are doubtless the reasons why courts have, in many cases, denied or limited the right to damages for such suffering. However, it seems to be illogical to refuse compensation to one whose health has been impaired as a result of fright, but to give damages to one who has been struck a slight blow, having no serious results.

We may consider three classes of cases involving mental suffering: (1) Fright, unconnected with any substantial injury to the person, either physical or mental. (2) Direct physical injury to the person, resulting in, or accompanied by, mental pain or disease, and (3) cases where there is no direct physical injury, but as a result of fright, disease, either mental or physical, ensues.

In the first class of cases, the law usually allows no recovery.[15]

Mental suffering is a proper element of damage only when it is connected with some substantial injury to the person. It has been said by some courts that this is so, because mental suffering is "vague," "sentimental" and "metaphysical."[16] I apprehend, however, that this cannot be the reason why the law does not allow an action in favor of one who, as a result of another's negligence, has suffered mental anguish unaccompanied with physical injury, because the law does allow damages for such injuries in many other cases when the injury, in this respect, must be equally "vague" and "sentimental." The sufficient reason why such an action cannot be maintained is because the law has not yet recognized mental anguish, apart from physical injury, as a cause of action.

This rule is illustrated by a Texas case in which defendant's locomotive frightened plaintiff's horse, causing it to run away. Neither plaintiff, who was driving, nor the horse was injured. Plaintiff was not permitted to recover for the fright which she suffered.[17]

However, the injustice of denying a right of action, for mental anguish alone, in all cases, has induced some of our courts to modify, or, as some think, to overrule, this principle in certain cases, and the present uncertainty of the law upon this question is shown in the decisions of the various courts in actions against telegraph companies for negligence in not promptly deliverig telegrams. In 1881 the Texas Supreme Court sustained the right of the addressee of a telegram to recover damages for the mental suffering he endured, because, by reason of the delay in the delivery of a message announcing his mother's death, he was prevented from attending her funeral.[18]

This decision was a new application of legal rules, if not the creation of an entirely new remedy, and the doctrine contained in it has come to be styled the "Texas rule." The same question has since then been passed upon by a large number of the courts of our various states and they are about equally divided upon it, one-half following the Texas cases and the other half denying the right of action under similar facts.[19] If increased litigation is a sufficient reason for refusing damages in such cases, the facts have fully sustained the reason, for in Texas and in other states following its lead, we find the books filled with reports of actions of this kind, and these courts have already begun to limit the scope of their earlier decisions.

The same Texas court has denied damages to a plaintiff who claimed to have suffered mentally because the family carriage did not meet him at the station upon his arrival home, due to the failure of defendant company to deliver his telegram.[20]

On the other hand, it is well established that in the second class of cases, i. e., when one has suffered a direct physical injury due to the negligence of a defendant, the plaintiff may recover both for the physical damage suffered and also for all the mental suffering and anguish which have resulted from defendant's negligence. Not only does the law in such cases give compensation for mental pain suffered by plaintiff up to the time of trial, but it even adds as an element of damage all future

14. L. N. A. R. R. vs. Snyder, 117 Ind. 435. See, also, 16 Am. & Eng. Ency. Law, p. 444.

15. Note, in 11 C. C. A. Rep., pp. 556, etc.

16. See, Wadsworth vs. Tel. Co., 86 Tenn. 721, cited in 11 C. C. A. Rep., p. 557.

17. Ry. Co. vs. Burton, 15 S. W. Rep. 197. See, also, Wyman vs. Leavitt, 71 Me. 227.

18. So Relle vs. Tel. Co., 55 Tex. 308.

19. See the various decisions cited in 11 C. C. A. Rep., pp. 573 and 4, and 15 C. C. A. 251, etc.

20. McAllen vs. Tel. Co., 70 Tex. 243.

suffering, mental as well as physical, which the plaintiff is likely to endure.[21]

Some cases seem to carry this rule to an extreme.

In Vermont, one who was bitten by a dog, not mad, was allowed damages for the apprehension of hydrophobia, from which plaintiff might in the future suffer.[22]

In Michigan a boy whose arm was maimed was given compensation not only for future loss of earning power and pain, but also for the permanent annoyance or humiliation he would endure.[23]

However, it is said that such future damages, whether physical or mental, must not be speculative, i. e., they must be reasonably certain to occur. This limitation is well illustrated by a New York case in which Dr. Spitzka was a witness. The doctor testified as to the plaintiff's present condition, tending to show epilepsy. In answer to a question as to what plaintiff's future condition might be, he answered: "A patient sustaining such injuries and presenting such premonitory signs may develop traumatic insanity, meningitis or progressive dementia or epilepsy with its results." The Court of Appeals held that the testimony was objectionable because it violated the rule that "to entitle a plaintiff to recover damages for apprehended future consequences there must be such a degree of probability of their occurring as amounts to a reasonable certainty that they will result from the original injury."[24]

This rule, although it seems to be just when considered in the abstract, requires, when applied in many cases, a greater degree of certainty than medical science can give. The more careful and experienced physicians can frequently answer, only in the doubtful language used by Dr. Spitzka in the foregoing case, and it results that lawyers, in order to bring their evidence within the limits prescribed by the above rule, call as medical experts men who are willing to state as certain to result, what the profession knows is only problematical.

Upon the right to recover in the third class of cases our courts are divided. They are agreed, on the one hand (with the exception above noted in actions against telegraph companies), in denying a right of action for mental fright or anguish only, and, on the other hand, in awarding full damages for mental as well as for physical suffering, when connected with a direct physical injury—but decisions from courts of last resort are at variance, when the question is applied to cases where, as a result solely of fright, there ensues physical or mental disease. Many cases sustain the right of action upon this state of facts.

Recently in England a passenger on defendant's train was much frightened by reason of the car running violently down an incline and suddenly stopping. There was no physical injury, but as a result of the fright plaintiff suffered from nervous shock. A recovery was permitted.[25]

In a Minnesota case, the plaintiff was a passenger on defendant's street car. At the intersection of another line the car was driven in front of an approaching cable car. No collision occurred, although it seemed to be imminent. The fright due to the incident threw plaintiff into convulsions and caused a miscarriage. The court held that, though no action lay for mere fright, yet for physical injury, which was the result of fright, there could be a recovery. And in that case if fright was a natural result of defendant's negligence, and if the fright produced convulsions resulting in plaintiff's illness, then the negligence of defendant was the proximate cause of plaintiff's injuries and she was entitled to a verdict.[26]

On the other hand, some courts have refused to allow damages under similar circumstances.

In an early New York case a woman who was frightened by a runaway horse, as a result of which she suffered serious nervous disease, was held to be not entitled to recover. In that case the horse barely missed striking her. If it had done so she would have been entitled to compensation for her fright and mental anguish as well as for her nervous troubles.[27]

A most instructive case upon this point is a recent one, also in New York. The plaintiff was about to enter one of defendant's horse cars. Another car approached and the horses, swerving to one side, almost but not quite touched the plaintiff and so frightened her that a miscarriage resulted. In the Supreme Court it was held that she was entitled to recover. The Court of Appeals (being the court of last resort in New York), however, denied her right to an action. Among other reasons for this conclusion, the court said: "If the right of recovery in this class of cases should be established it would naturally result in a flood of litigation in cases where the injury complained of may be easily feigned without detection and where the damages must rest upon mere conjecture or speculation. The difficulty which often exists in cases of alleged physical injury in determining whether they exist, and if so, whether they are caused by the negligent act of the defendant would

21. Note in 11 C. C. A. Rep , pp. 561 and 580, etc.
22. Godeau vs. Blood, 52 Vt. 251.
23. Power vs. Harlow, 57 Mich. 119.
24. Strohm vs. N. Y. L. E. & W. R Co., 96 N. Y. 305.
25. Bell vs. Ry. Co.; L. R. 26 Q. B. & Ex. Div. 428.
26. Purcell vs. St. Paul City Ry. Co., 48 Minn. 134. See, also, note in 11 C. C. A. Rep., pp. 559 and 560. C. & N. W. Ry. Co. vs. Huneberg. 16 Bradw. (Ill.) 387 and 11 Hamilton & Godkin's "Legal Medicine," p. 379.
27. Lehman, vs. R. R. Co. 47 Hun. (N. Y.) 355.

not only be greatly increased, but a wide field would be opened for fictitious or speculative claims. To establish such a doctrine would be against public policy.[28]

The late Austin Abbott, in commenting approvingly upon the decision of the Supreme Court in this case, before it had been reversed by the Court of Appeals, says: "We understand that the highest medical authority regards the principle laid down in this case as in accordance with well recognized facts in medicine. It is an admitted fact that mental shock is quite as capable of producing diseases as is physical injury. Many diseases known to the medical profession are the direct outcome of nervous shock. There are many forms of such disease. To instance only a few—some of the most violent forms of chorea, commonly known as St. Vitus' dance, are due to fright. Mental shock has also frequently been known to produce a disease of the heart, known as Graves' disease. Shock of the kind suffered in this case, therefore, enters into the causation of disease, recognized as such by all medical authorities. When mental shock is of a depressing kind, e. g., severe fright—it is very likely to produce insanity, if followed by sleeplessness. These are only illustrations that go to show that disease may be so frequently traced to mental shock that we can say that shock is a true cause and not merely a concomitant. Then, too, there are many diseases which owe their intensity in large part to shock, but of which the shock is hardly the cause, but rather an aggravating circumstances.

"In this case there can be no doubt that the miscarriage may have been the result of the shock experienced by plaintiff. Shock is certainly capable of producing such a result, and it is of no consequence how far the pregnancy may have advanced."[29]

It is in the conviction that the questions I have suggested must eventually be solved upon a scientific basis and with the aid of the medical profession, that I propose them to you, with the hope that by enlisting the interest of medical men the law may, in these respects, become settled upon just and sure principles.—Medico-Legal Journal.

Treatment of Infected Gun-Shot Wounds.

In the summers of 1896 and 1897 Koller, at the suggestion of Prof. Tavel, made in the Bacteriological Institute of Bern, a large number of experiments on rabbits, in order to ascertain what measures were likely to be followed by the best results in the treatment of wounds produced by infected bullets, and to learn if micro-organisms are forced into the tissues surrounding a wound canal, as is claimed to be the case by Müller. The animals experimented upon were divided into a number of series. In the first series, used to control the virulence and correct dosage of the micro-organisms employed, the wounds of entry and of exit were immediately closed by sultures and dressed in a manner to prevent secondary infection. In the 2nd, the wound canal was at once burnt out with the thermocautery and protected by occlusive dressings. In the 3rd, the channel made by the bullet was penciled with tinct. iodi fortior carried in on a sound, and the wound dressed in the same way as before. In the 4th, the wound was simply drained, a strip of iodoform gauze being pulled through and secured by a stitch. In the 5th, a glass drainage tube was laid in the canal, the wound of exit being closed with a continuous silk suture. In the 6th, the track of the projectile was thoroughly disinfected with a 5 per cent. sol. of carbolic acid, both openings being closed with a pad soaked in the same solution. Of those animals which recovered, the time required to get well was the same—about 30 days—in the series treated by glass drains, by gauze strips and in the control anima's where no drainage had been employed. The wounds which were swabbed out with 5 per cent carbolic acid solution showed but slight pathological changes, and abscesses, when they occurred, were small; while those treated with the cautery or tincture of iodine exhibited, a few days after the injury, marked inflammatory phenomena with the development of generalized abscesses. Moreover, the general condition of the rabbits treated in the latter manner was by no means so good as when carbolic acid solutions were used, and they showed a more marked and more rapidly progressing emaciation. It is very natural to ask why the control animals, in which the wounds were immediately closed, and those in which simple drainage was employed, did well, while after thorough disinfection with carbolic acid, iodine or the cautery, serious results followed. It would be supposed that the more thorough the disinfection of the wound canal the less harm would result from the micro-organisms carried into the tissues by the bullet. But it must be remembered that these bacteria are not only deposited in the canal itself, but are forced into the neighboring tissues, and are in consequence not destroyed by disinfection of the wound canal however energetically it be carried out. On the contrary, the agents used to produce disinfection, diminish the vitality of the tissues surrounding the canal, and render them favorable media for the development of the germs of disease, forced into them by the

28. Mitchell vs. Rochester Rv. Co., 25 N. Y. Supp'l Rep. 744. 28 N. Y. Supp'l Rep. 1136, and 45 N. E. Rep. 354.
29. I. University Law Rev., p. 10.

pressure of the bullet in its passage. In simple drainage, however, no injury is caused to the structure of the part except that primarily produced by the bullet. And in the case of the control animals, where the wounds were immediately closed and the escape of all secretions cut off, the vitality of the tissues was not interfered with at all, and the isolation and distribution of the bacteria enabled them to be more easily overcome by the phagocytes. The author, in this connection, expresses his belief in the truth of Schwarzenbach's dictum, that the ease with which operative wounds are infected is due to the mechanical injury of the tissues incidental to the operation itself and especially to the contact of irritating antiseptic substances, and he maintains that a wound produced by sharp instruments and cleansed only with physiological salt solution, is far more likely to heal well and quickly than if sublimate or carbolic acid are used. The author believes that an infection through bullet wounds is always possible, since neither the heating of the shot nor the friction to which the bullet is subjected in its flight is sufficient to destroy bacteria adherent thereto. Still no germs may be implanted in the tissues at all, or, as more frequently happens, the organisms which are so implanted are too small in number, and what is of more importance, are of too slight a grade of virulence to produce infection. Occasionally, however, the number of bacteria so carried may be great and their virulence pronounced. The whole question of infection in this class of injuries depends, therefore, upon the number and virulence of the germs implanted in the tissues by the bullet; and although these may be so numerous and pathogenically active as to cause a fatal sepsis, yet of all forms of treatment simple drainage and the protection of the wound against secondary infection offers the best chances of a satisfactory result.—National M. Rev.

An Efficient Bandage for Fractures.

By Dr. F. J. Clippert.

If I may be permitted I want to correct the published title of my paper, and state that it should read, "An Efficient Bandage for Fractures." In the whole domain of surgery there is probably not one operation which calls for greater knowledge and application of detail than the treatment of fractures, and, to my mind, no surgical condition admits of greater diversity of practice and thought. In this paper I have no new suggestions to offer to the general indication laid down in the treatment of these lesions by Hamilton in his work on "Fractures and Dislocations," namely, first, to reduce the fracture; secondly, to maintain it in place, and thirdly, to control and prevent inflammations and other complications. It makes little difference as to the methods followed if we meet the indications above outlined.

I simply desire in this paper to present a simple description of the advantages possessed by the bandage which I use in my practice over many others which are commonly used, such as plaster paris, starch, gum shellac, cloth, muslin and others. The bandage which I exhibit is known as the "Crinoline" or "crown lining." It is 2½ inches wide by 12 to 20 feet in length. In selecting this fabric care should be taken to obtain only the starched crinoline. There is a stuff manufactured and stiffened with flour which is worthless as a bandage. The advantages which I claim for this material I may say, at the outset, is that it is easy of application, and when moistened with water it soon becomes stiff again, making a very compact and neat dressing that is firm and will not shift easily. Besides, if it is desired to make the bandage more firm, the meshes of the fabric are such that they can easily be filled in by dusting thereon the dry plaster paris or starch, and afterward moistened with water upon the hands, quickly sets. Ease of preparation and cleanliness are matters for consideration in surgical dressings, which qualifications are possessed by the crinoline bandage, and, when plaster paris is not used they are certainly not affected by temperature. Given a case of fracture at the surgical neck of the humerus. I have had two such cases recently, both occurring as the result of direct violence in persons aged respectively fifty-five and sixty-seven years. In both of these cases I adopted the following plan of treatment:

After the reduction of the fracture, as well as possible, I moistened thoroughly a heavy piece of cardboard, cut large enough to extend above the shoulder joint to the elbow, and applied to the outside of the arm, enclosing about one-half of the circumference of the limb. This I allowed to become dry after it had been perfectly molded before I secured it to the arm. A second short splint was applied on the inner side of the arm, the same precaution being taken as in the other case. Both of these splints were then, of course, carefully padded and made fast to the arm first with the ordinary roller bandage, after which the crinoline bandage was applied in the following manner: The roller of crinoline was wet with tepid water and carefully applied in successive layers; separate turns were taken around the body over a protective of sheet wadding to secure the arm to the side. After this dressing my patients were advised to maintain perfect quiet until the bandages hardened, and, as a result, in a very short time

a perfect cast was obtained. After removal of these bandages I found that the whole dressing, besides having the advantages above spoken of, were extremely light and the patients complained none whatever of either the weight of the dressing or any of the other annoying inconveniences, which most dressings have. During the whole time that the dressing was applied the patients went about feeling perfectly secure that no accident should occur to the injured limb because of their doing so, while I had none of the usual annoyances which the surgeon experiences when the ordinary muslin bandage is applied, such as dressing becoming continually loose, etc.

I have been using this bandage in my practice during the past year, and it has always yielded me most satisfactory results. I presume that many of the gentlemen present have had experience with this dressing. To those who have not, I desire briefly to commend it as an efficient and simple method of dressing fractures.—Fort Wayne Medical Journal-Magazine.

The Field of Railway Surgery.

Railway surgery has a field wholly its own.

The mission of railway surgery should be:

To arrive at the highest stage of excellence in ability to treat the injured.

To establish the railway hospital as a fixed system in railway service, the better to execute the first great duty, and to give the most exposed class, the employe, the very highest and best surgical service, combined with the greatest economy to both railway and sufferer, be he employe or passenger.

Prevention of injury upon railways as far as possible.

Improved sanitary measures in the interest of the general public in the transportation of passengers, to prevent infection or the spread of contagious diseases.—Georg. J. Med. and Surg.

Notices and Reviews.

The Diseases of the Stomach. By William W. Van Valzah, A. M., M. D., and J. Douglas Nisbet, A. B., M. D. Illustrated. Philadelphia: W. B. Saunders; Chicago: W. T. Keener. 1898.

Ewald, in the last edition of his work on diseases of the stomach, says that no one should confine himself specially to the diseases of this one organ, as it offers too limited a field. It is surprising, therefore, to note how many books have recently appeared dealing solely with the disorders—the medical disorders—of the stomach. It would seem as though the fascination of exacter diagnosis by the aid of the stomach tube and chemical examination of gastric contents had attracted many physicians to a closer study of the affections of this important viscus.

It is a cause for regret, however, that with increase of knowledge there appears to be a tendency toward complexity of classifications and terms, rather than toward a simplification. It is to be hoped that there shall be in the near future some clear and comprehensive classification of these diseases, some uniformity in terms. For instance, dilatation of the stomach, commonly classified as a disease because of its peculiar symptoms and signs, is described by our authors as a symptom or effect of obstruction or muscular weakness. The words "dyspepsia" and "dilatation" impede medical progress and should become obsolete (p. 19).

All diseases they divide into the two classes, dynamic (functional) and anatomical. Under the heading of dynamic affections we meet with the following: Bulimia, acoria, parorexia, anorexia nervosa, etc. Some who have not kept pace with modern gastric nomenclature will scarcely recognize some of their old friends, "trifling indigestion," "a little upsetting of the stomach," "slight bilious attack," or a "touch of dyspepsia," under such high-sounding terms as adenohyperesthenia gastrica, hyperchlorhydria tormina ventriculi nervosa, gastritis glandularis proliferans, etc. While one may not object to the use of the Latin terms for diseases, one may see some inconsistency in such mixtures of English and Latin as "digestive hyperchylia gastrica." And why, if we speak of rumination or merycism, can we not speak of eructation, instead of eructatio? We get the impression from the table of contents, from the introduction and from chapters in the book, that if it were shorn of many of its high-sounding phrases, if chapters were here and there boiled down to paragraphs, if classification were simplified, the good sense of the work—for it is there—would be more readily grasped.

Some parts of the work are excellent. Dietetics, so important in the treatment of alimentary disorders, is dealt with very fully, perhaps too fully, compared with some other portions. The chapters on the vicious circles of the stomach and on the relation of the dis-

eases of the stomach to those of other organs are full of well-put truths.

There is occasionally, we think, in an effort to give utterance to epigrammatic or striking sentences, particularly where the superiority of the modern physician over the physician of the old school is referred to, a tendency to speak rather extravagantly, and this occasionally creates the impression of straining after effect. At the end of a chapter on Symptomatic Treatment it is said: "This chapter will be ended without apology, for we have a feeling akin to scorn against the symptomatic treatment of diseases of the stomach" (p. 253).

We would suggest that the authors, if they hold this view, should, with lofty disdain, draw the blue pencil through this entire chapter and spare their feelings the terrible racking they must undergo whenever their eyes light on "symptomatic treatment." Again there is an overstatement or a wrong impression conveyed in what is said of the tongue on page 55: "The tongue is not a mirror of the stomach, as the ancients supposed. A clean tongue is an index of local cleanliness, local health, and the state of the secretions of the mouth," etc.

While we criticize these and many other points in the book it must not be judged that we deem it untrustworthy and undeserving of praise. If we can overlook a certain supercilious air that seems to pervade the work we can find the latest views on diagnosis and treatment well described. Anatomy and pathology are not dwelt upon at too great length. There is an evident desire to make the book practical, "simple, clear, practical and complete in useful information," to quote from the introduction, and the authors have succeeded fairly well.

The book is well gotten up, with a few good half-tones, and is accompanied, as are all of Mr. Saunders' publications, by a voluminous index. JAMES B. HERRICK.

The Surgical Complications and Sequels of Typhoid Fever. By W. W. Keen, M. D., LL. D. Based upon tables of 1,700 cases, compiled by the author and T. S. Wescott, M. D., with chapter on ocular complications of typhoid fver, by G. P. Schweinitz, A. M., M. D. Philadelphia: W. B. Saunders; Chicago: W. T. Keener. 1898. Price $3 net.

This volume of 365 pages presents the results of a careful consideration of practically all the cases pertaining to this subject which have been published during the past fifty years, comprising over 1,700 cases.

Twenty years ago the now celebrated author distinguished himself by delivering The Toner Lecture No. V. on the Surgical Complications and Sequels of the Continued Fevers, in which he carefully reviewed the subject up to that date. Unfortunately, the valuable lectures provided for by Dr. Toner are not given the wide distribution which their value deserves, and therefore we are especially indebted to Dr. Keen for republishing that lecture as an appendix in the present volume.

It is quite impossible for us to present a detailed review of this valuable monograph, as it deals so extensively with statistics, and to do it justice several pages would be required. In outline we can state that there are 21 chapters; the principal ones are devoted to pathology of the subject, typhoid gangrene, typhoid affections of bones, joints, typhoid abscesses and hæmatomata, and anatomic varieties of the manifestations of secondary typhoid lesions. To these are added the excellent chapter on ocular complications and one on conclusions, including the report of a number of valuable heretofore unpublished cases. The Toner lecture is added as the appendix.

It is quite strange that during the twenty years since the publication of the Toner lecture no complete presentation of this subject has been attempted. Since then over 900 cases have found their way into literature, and while we regret the delay, the medical profession are surely to be congratulated that the complication and consideration of all this valuable material has been in the hands of such master minds. The author calls especial attention to the deficiencies in the accuracy of our knowledge of most of the subjects considered, and very properly calls attention to the fact that all cases should be carefully recorded and diagnoses confirmed by bacteriological tests.

We desire to especially congratulate the author upon the completeness and value of this work, and also to congratulate Drs. Wescott and de Schweinitz upon their being associated with one of those great men who properly appreciates the work of his as-

sociates and gives them due credit for their part in the preparation of the product of their combined labors.

The press work and illustrations are in keeping with Saunders' publications, while the binding is in conformity with the other volumes of his series of valuable medical books.

A. I. B.

A Text Book on Surgery; General, Operative and Mechanical. By John A. Wyeth, M. D., Professor of Surgery in and President of the Faculty of the New York Polyclinic Medical School and Hospital, etc., etc. Third edition, revised and enlarged. New York: D. Appleton & Co. 1898.

This new edition of an old and very popular text-book appears as the latest work on surgery. The fact that the third edition is presented since 1887, when the first edition appeared, is sufficient proof of the popularity of this particular book, and it also impresses a reviewer with the fact that the profession at large must know so much about the author's work and reputation that he is really called upon to mention only the special features of the new edition.

It has always been a pleasure to read and consult Wyeth's Surgery. While its size prevented complete and exhaustive consideration of all subjects, the author exercises rare discretion generally in the allotment of space to the various divisions and in the practical manner in which the subjects were presented. In this new edition we find, as would naturally be expected, that the work has been brought thoroughly up to date. This has necessitated the rewriting of much of the volume, but as the work has been done by the same author and in the same smooth, clean, concise way the revision has caused no breaks in the character or readability of the book.

The author of a single volume on such a vast subject must be conservative and yet progressive in order to consider much and do it well. Dr. Wyeth has added such new matter as has been accepted to that which had already been demonstrated to be of value, and in order to keep the size of the volume within the limits of ready usability he has very wisely eliminated considerable less important matter.

The addition of pages on wound-healing under various conditions, and the full consideration of the various infectious surgical diseases, will greatly enhance the value of the volume to both the student and the general practitioner. Six chapters are devoted to surgical pathology, three to anæsthesia, surgical dressings, asepsis, antisepsis, bandaging, etc., two to wounds, hæmorrhage, gangrene, etc., one very full chapter is given to amputation and three deal with the diseases and injuries of the various circulatory apparatuses, including exceedingly good illustrations on the relation of vessels, etc. Other chapters are devoted to lesions of bones and joints, to deformities, regional surgery, and the last one to tumors. We desire to especially call attention to the constant reminder of the surgical anatomy of the part involved by the author. That too little attention is given to this important element of good surgery is well recognized by all teachers of practical surgery who come into intimate contact with the students. Ligations form but a small part of our actual work, but if their consideration serves the purpose of keeping the importance of the location and relations of the vessels in the minds of students and practitioners it will have been of very great service to all concerned. We regret that so little space is devoted to the important subject of tumors. A subject to which volumes is now often devoted certainly should have more consideration than is here noticed. This criticism may be due to a mere difference of opinion, but from the reviewer's standpoint it appears as a serious defect in a work on general surgery.

The book is profusely illustrated by over 950 excellent illustrations. They have been selected with unusual care and certainly do illustrate the text satisfactorily. The work of the publisher has certainly been most excellently performed in every detail. Such products reflect great credit upon the management of publishing houses.

This book deserves to, and unquestionably will, maintain the position occupied by the former editions, as one of the most satisfactory text-books on surgery. A. I. B.

Brief Essays on Orthopædic Surgery. By Newton M. Shaffer, M. D., surgeon-in-chief to the N. Y. Orthopædic Dispensary and Hospital, etc., etc. New York: D. Appleton & Co. 1898.

In the preface we learn, that "At the request of a few friends, who have been kind enough to take considerable interest in my work, these essays, which have appeared at various periods during the past fourteen years,

are now presented in their present form, and they are submitted to the medical profession and the public with the hope that orthopædic surgery may be benefited by their publication." A. I. B.

Transactions of the Medical Society of the District of Columbia, from March, 1896, to January, 1897.

These transactions contain an abundance of well-presented case reports, but the proportion of papers showing original research is small. H. G. W.

Transactions of the Texas State Medical Association, 29th annual session, held at Paris, Texas, April 27-30, 1897.

This report would indicate a severe slight to general medicine at the session, since it is dismissed with three very brief papers, the longest having the extremely appropriate title of "Hotchpotch." Surgery, gynæcology and ophthalmology, the only other sections represented, receive at least more space. It is to be hoped that the spelling exhibited in this report is attributable to some especially pernicious variety of proofreaders or compositors rather than to original and unique methods of the writers. H. G. W.

PAMPHLETS RECEIVED.

"The Preliminary Conduct of Intestinal Operations—The X-Ray from a Medico-Legal Standpoint," by R. Harvey Reed, M. D., Rock Springs, Wyo.

"A Preliminary Report on a Method of Overcoming High Resistance in Crookes' Tubes—A Possible Step Toward Maximum Radiance," by Wm. W. Graves, M. D., St. Louis, Mo.

"A Clinical Study of Kryofine," by Sidney V. Haas, M. D., and J. Bennett Momson, M. D., of New York.

"Fracture of Base of Skull, Complicated by Fracture of Lower Jaw," by G. W. Hiett, M. D., of Pittsburg, Pa.

"Injuries from 'Live' Electric Light and Trolley Wires," by J. J. Brownson, M. D., of Dubuque, Ia.

"Neurotic Eczema," by L. Duncan Bulkley, A. M., M. D., of New York.

"The Surgery of the Gall Bladder and Its Ducts," by H. O. Walker, M. D., of Detroit.

"Diet for Consumptives," by Reynold W. Wilcox, M. D., of New York.

"Congenital Phimosis—Contributions to the Treatment of Clubfoot," by Alex. Wiener, M. D., of Chicago, Ill.

Personal.

Dr. E. W. Lee was elected second vice-president of the Omaha Medical Society at its late meeting.

Dr. W. T. Sarles of Sparta, Wis., was elected a member of the Board of Censors of the Central Wisconsin Medical Society at its late meeting.

Dr. J. N. Warren of Sioux City, Ia., was re-elected secretary and Dr. G. G. Cottam of Rock Rapids, Ia., treasurer of the Sioux Valley Medical Association recently.

The officers elect of the Association of Surgeons of the Southern Railway Company are: President, Dr. George Ross, Richmond; first vice-president, Dr. S. R. Miller, Knoxville; second vice-president, Dr. George R. Dean, Spartansburg, S. C.

Dr. R. P. Izlar, house surgeon of the Plant System General Hospital at Waycross, Ga., has been appointed by the Governor of Florida Chief Surgeon of the First Florida Regiment, U. S. Volunteer troops, with rank of major. Dr. Izlar left for his post of duty May 23.

Dr. S. H. Shoptaugh of Princeton, Ind., died there on July 13 of Bright's disease, after a short illness. He was local surgeon for the Louisville, Evansville & St. Louis and Evansville & Terre Haute railroads. He was fifty-seven years old and leaves a widow, son and daughter. The doctor contributed an article to The Railway Surgeon of June 14.

Dr. John H. Brinton, Professor of Surgery in Jefferson Medical College, Philadelphia, says (College and Clinical Record): In fracture about the elbow-joint where any doubt exists about the diagnosis, place the patient under ether. These fractures, except the coracoid and olecranon processes, may be best treated with an anterior angular splint, and, if deemed necessary, a posterior trough. Do not fail to warn the patient that stiff joints often follow these fractures. By this simple precaution one will often avoid a suit for damage.

Dr. Heller finds that the addition of a small amount, say one-fortieth grain, of arsenous acid is of material aid in preventing the appearance of drug eruptions, as of the bromides, salicylates, iodides, etc.—Phil. Polyclinic.

THE Railway Surgeon

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EXPERT TESTIMONY IN DAMAGE SUITS.*

BY DR. E. H. TOWNSEND, NEW LISBON, WIS.

A friend who stands high in the legal profession said to me: "In my practice I have often been astonished to find medical men becoming intense partisans, when called upon to testify as experts in damage suits against railway companies or in suits against corporations or municipalities, and I wonder why it is."

To this I could give no satisfactory answer; so for the past one and one-half years I have given the subject much thought, asking medical friends acting as surgeons for different companies their reasons for this state of things. The answers are varied, as they partake of the nature of the men giving them, one answering: "The pride of personal opinion, prompting a man to defend the points made, as would a politician or theologian, as against an opposing opinion;" another, that we should work for the side retaining us, as we are paid or retained by them, and should do the best we could to help on the case; another, that some men seek glory and public notoriety through being seen frequently in court and getting their names in papers as noted experts; again, I find the better class of surgeons deny the allegation, claiming that when they are called to testify, they state the truth as near as they know it, leaving the parties interested in the suit to accept or reject their evidence as it will be given in court.

Now, as we are frequently called upon by the company to give an opinion either in or out of court—usually, however, before the case is tried—as to the extent of damage suffered, the disability caused, and the prognosis, and to what extent and time the injury will disable the plaintiff in a case, we best serve the company we represent when we plainly, honestly, and intelligently state to them to the best of our knowledge the extent of the damages incurred, what we consider fair compensation financially, and advise settlement if they are legally liable upon this basis. We can certainly do nothing else, for are we not sworn to tell the truth, the whole truth, and nothing but the truth?

I believe, too, in most cases nothing stands in the way but the greed of what is often in cities called ambulance lawyers, chasing after every injured man to start a suit for damages. This, with the knowledge that the average juryman stands ready to "do" a company, ofttimes prevents settlement, even upon a fair basis. So with these forces to contend against, excessive damages are demanded, and it becomes necessary in self-preservation for the case to be fought out to the end. Then we see the weakness of our present system of "expert testimony" before a jury. Then they stand ready to accept the testimony of one man calling himself a specialist, no matter if he has no reputation among the medical men, though against him may be a man honest, able and fitted by years of experience to give this jury the fruits of his ripe thought. Are they not both doctors, and is not the former against the company?

Sad to say, able men will take the stand and make statements which are not medically true, for all able men are not honest, and will sit beside the plaintiff's attorney putting questions into his mouth with which to confound and break the force of testimony which he knows to be correct, and the jury is left in a tangled mass of technicalities to sift out the grain from the chaff.

A case related to me by the court reporter of the Sixth Judicial District of Wisconsin,

*Read at the fifth annual convention C. M. & St. P. Surgical Association, Chicago, Oct. 28-29, 1897.

bearing on this subject, was tried in Sparta, Wis., this fall. The suit was to recover damages against the Chicago & Northwestern railway for a man injured on the crossing near that place. In about two and one-half weeks he died, and suit was brought. Of course the plaintiff's attorney found witnesses to swear the whistle was not blown nor the bell rung. The medical evidence showed a young man, 25 years of age, who had been suffering from diabetes mellitus for several months, passing large quantities of sugar, yet said one of the plaintiff's medical witnesses: "I had him nearly cured, and he was fast recovering and would have gotten well except for the injury." The testimony of the railway surgeon who saw him showed plainlv that the party died of diabetic coma.

The company had for witnesses the following men, who are fitted by long years of hospital, asylum, post-graduate and private practice to speak well and understandingly of any subject in medicine: Dr. Frank Billings of Chicago, Dr. Walter Kempster of Milwaukee and Dr. W. T. Sarles of Sparta; against them were a trio consisting of an eclectic, a homeopath and a regular, the first with but a few years of private experience, the second a good citizen but without any special fitness to testify in these matters, the third one whose life practice had mainly been in a village of less than 1,000 people with the surrounding country. One of this lot testified positively that diabetes mellitus was a curable disease, the others that it could be helped so patient might have long years of useful life. The company's surgeons testified to facts well known to us all, that in a young man the prognosis was fatal, the duration of life but a few months. By the jury all this wisdom, all this fitness to testify, the wish being father of the thought, weighed in the scales of justice less than the three without fitness or thought, and a heavy verdict was rendered against the company.

This is but a sample case which, in the experience of those present, could be multiplied a thousand-fold. Now, given the case, what the remedy? To find the remedy prompted this paper, for we all feel its need.

My remedy is, to save us from the jest of the legal fraternity, whose oft-quoted words are, "when doctors disagree, who shall decide?" to take the retaining of expert testimony entirely away from either party to the issue joined, and to place it entirely with the court. Let the judge of every judicial circuit choose three reputable professional men, esteemed by the medical men in said district, to be paid and called upon by the state when needed, they having the power to call a chemist or expert surgeon in difficult cases should they need, the state to pay for this also. These medical men to act as advisers to the court and jury as to the damage sustained, the effects of poisons, of wounds, in murder trials stripping this counsel of all medical verbiage, in plain, simple language that could be understood, give them the true points in the case. Then would the medical testimony assume the dignity of a judge's charge, then would the public be best served, the parties to the suit have exact justice, the poor client an equal chance against the giant company or corporation, and the ends of justice be best obtained. This would not, of course, shut out any surgeon from being witness as to facts in a case.

DISCUSSION.

Dr. A. I. Bouffleur, Chicago, Ill.: There are a couple of points in this paper which I wish to discuss, and first, I wish to present some of the points in Dr. Sarles' case. I regret that the doctor is not here this morning, because there were several points in that case that are remarkable, and because he has some very positive convictions upon the subject of expert testimony which I know we would all like to hear. The strange part of this case, and the part which Dr. Sarles presented in his paper a year ago, but a point which I wish you would make a note of, is the fact that Dr. Sarles had treated the patient in question some six or eight years previously for diabetes. Shortly after this injury which he sustained he became comatose. The man was several miles from the doctor's place. He happend to have the necessary chemicals, etc., with him to make an examination of the urine right there at the bedside, and at that time before the man's death detected sugar in the urine. Now, his being prepared to make the examination at the time of this visit gave the company the only real source of defense they had in that particular case. The remarkable feature of the case is, that the

jury returned a verdict which was rather queer. In the first place they agreed that the man had had diabetes a few years before; they decided that he had been cured of it, and that his death was from diabetes which had been caused by the injury. That was the work of the jury.

I wish to mention another point, and the one that is always coming up, that after an examination the doctor should not put a money value on the patient's damages. It may be practicable in small places to do so, but in the cities, Chicago at least, I believe that just as soon as a doctor states that a man is entitled to $10 or $10,000, just that soon his medical opinion is thrown out as being absolutely worthless. I would no more think of telling a patient, or a claim agent in Chicago, what a patient's damages were probably worth in money, that is in the presence of the patient, than I would think of jumping out of this window. There is no question but as soon as we leave our sphere as examining physicians or surgeons and go to putting money values on damages, just that soon we are looked upon by at least a considerable number of people as being claim agents or partisans of the company. Therefore, it is in large places the physicians or surgeons of railroad companies do not have anything, you might say, to do with the settlement of cases.

Many of you have doubtlessly been called upon to settle cases for the company. Now, that is done for various reasons: First, as a rule, in a small case or cases which do not involve thousands of dollars, in which the physician is right on the ground, acquainted with all of the facts, and the patient knows that he is acquainted with all of the facts, talks with him freely, and in that way they get together sooner than if it was done through a third party. The railroads like this plan because it saves them the expense of sending a man there especially to settle the case, and they also appreciate it if the doctor has the resources and inclination to do so. If his standing in the community is high he will, in the vast majority of cases, make a better settlement than a claim agent could—I mean in small cases. Of course, if the man wants $25,000, the wise claim agent, as a rule, does not ask the doctor how many dollars, but he asks him what the man's condition is. Large damages usually involve legal and other points which the claim agent is supposed to be especially equipped to handle. So the question of putting a monetary value upon injuries is a very delicate one, and while I should hesitate to do it in a place of this size, where the employes become very shrewd, and where they are tampered with by questionable lawyers, and where it is damaging for doctors to mix up with the money question. Yet in smaller places it is at times practicable and advantageous to all concerned.

As to Dr. Townsend's suggestion that the only way to have true experts is to have them selected by the court, there is no question at all, I think, in the present medical mind, but that we need some very radical change; that seems to be the one which is most generally advocated, and if the medical mind is agreed that that is the thing, why in the world don't doctors get together and have them pass such a law? In Wisconsin, in Illinois and Minnesota, there are no such laws as that. We have had recently a noted criminal case in this city in which experts were coaching the lawyers and brought in gorilla bones and everything else to confuse other expert witnesses. Now, such things are damaging not only to the reputation of expert witnesses and to the value of expert testimony, but it is also damaging to the science of medicine itself, because the public at once says well, if this man says one thing and the other another, and they are both supposed to be experts in it, why there cannot be much science in it.

Now, we are constantly found completely at fault, a human fault, because the best of us cannot help but let our minds trend a little to the arguments which an attorney of a given side will present to us. If you are hired by the defense you talk with the defendant's lawyer, learn his views, and you are constantly in that atmosphere, you might say, and before you know it you become partisan. You do so right along in railroad work, I have no doubt, unconsciously. However, the best railway surgeon is the man who always sticks to the truth, the plain, honest simple truth, whether it is against the company or whether it is for the company. Never give the company a favorable opinion

if the case does not deserve it. You do that company an injustice, because they are likely to believe that the man is not seriously hurt, and he loses an opportunity to adjust a case and may cost them thousands of dollars, where, if they had known the exact condition of the man, they might have adjusted the claim. Always give the company, if anything, a shade the worst of it in an opinion. Let them know the fact, and your having done that does not interfere with your going on the stand as an expert in the least, because you are serving the man simply as an examining physician, regardless of being for a company. In the second instance you are serving as an expert, perhaps on the same technical points, and your expression of opinion in the one instance does not interfere with your expression in the other. Just as soon as you show a bias, just that soon you begin to jeopardize the weight of your opinion as an expert.

If we could only take the experts away from the two sides of the case, then I think we would have the matter simplified very much. I want to repeat that if that is the opinion of the doctors present I think we are culpably negligent in not doing something politically about it. Each one of us belongs to a state society which has a political bearing to the local body politic in our respective towns. In this state that matter is being agitated very earnestly, and I hope to see it before the next session of the legislature and to have the question of expert testimony disposed of in Illinois, and if the medical profession would be a unit in this matter I believe we could effect a trial of this plan of selecting experts.

Dr. H. C. McCoy, Algona, Ia.: I believe it would be but one step along the line of Dr. Townsend's paper, but I would like if there could be some way by which the appointment could be taken out of the hands of the judges. I know that the appointment by the judges in any case is largely given as political favors. If it could be left to the state medical associations to say who should be experts, or if there could be a certain number of experts appointed by the state, then they would be given to each judicial district. I think the people of Iowa would be in perfect harmony with it.

Dr. Townsend (closing discussion): My idea was simply to get the matter out of the hands of either party interested in the suit. For this reason: Among the common people it is said we cannot fight a railroad company; we cannot fight a corporation. We have not the money to do it with. They have retained experts in the legal profession and in the medical profession; they control the legislature by their passes, and we cannot have fair play, and the jury who are called upon to decide that question feel as the people feel about that matter, and, feeling that way, whenever they get a chance at a company or a corporation they fix that company or corporation all that they can. Now, if they felt that the expert testimony was entirely outside the control of the corporation; if a jury felt that, and if that testimony gave the opinion that a man was injured to a certain extent they would be much more apt to accept that testimony than if it came from a party interested. They would say, here, these neighbors are here to help us as a people; they are not here for the corporation, and they are honest and fair and just and we will pay attention to their testimony. Then tne lawyers would be prevented from tangling them up with hypothetical questions and making a case for or against their side.

A lawyer in La Crosse—the man had received a brain injury—said to a friend of mine: "I will take a Sunday and I will look up the cranium and come into court the next week to ask hypothetical questions of a witness who has spent weeks and months in studying about the cranium." Now, he comes into court and he has an expert sitting at his shoulder. What shall we do? You know the medical profession is the laughing stock of the legal profession because they are prepared to entangle us, and they can get somebody to swear to the direct opposite to us. Early in my practice in Wisconsin I was called to a case in which the Minneapolis, St. Paul & Omaha was concerned. An old gentleman, a man of rare ability, a man who stands high as a citizen and in his profession, came on the stand and testified that a man injured could not live two years; that he would die in two years. That happened twelve years ago and he is alive yet. Now I respected that man and I was astonished. He sat side by

side with the counsel for plaintiff and he put questions in his mouth to confound me and for two and one-half hours I was on the stand, and in making one statement I did not stop to consider the answer and no sooner was it made than I saw that I had made a mistake, and yet when they called the surgeon in chief he went on the stand and made the same statement I did. After the trial I said to him, "Doctor, don't you know I made a mistake, and yet you went on the stand to confirm it." He said, "Yes, I know it."

WHAT PRODUCES ANKYLOSIS OF JOINTS?*

By Dr. O. W. Phelps, Britt, Iowa.

To determine the question of whether prolonged fixation of a joint would result in ankylosis I determined to satisfy myself by a series of experiments on cats and dogs. I therefore commenced my experiments last December by first fracturing the femur of a young St. Bernard dog. The right femur was fractured at the junction of the lower and middle thirds. I gave the dog ether, shaved the limb, then washed it with a solution of bichloride, bandaged with iodoform gauze; then carefully covered it with absorbent cotton. Over this I applied a heavy plaster-of-Paris bandage, the leg being firmly held in a straight position until the plaster-of-Paris was well hardened. A well fitting jacket was now placed on the dog's body, after which the leg was drawn well forward and up against the side. A few turns of the plaster bandage were now passed around the body and limbs, fixing the latter well up over the dog's back, which completely immobilized the limb.

The limb was kept in this position for three months and four days, at which time the plaster-of-Paris was removed and the motion of the joints was as complete as it was the day that the fracture occurred, there was considerable atrophy of the muscles and contraction of the tendons. The dog was killed two days later; the ankle and heel joints were perfectly normal. In opening up the hip-joint the normal amount of synovial fluid escaped. There appeared to be a slight denuding of the periosteal coating of the acetabulum where the head of the femur pressed against it. There was also a dusky appearance of the entire head of the bone, showing that there had been considerable inflammation about the joint.

The next experiment was January 5, on a cat and a poodle dog. They were treated in precisely the same way, with the exception that the limb was not broken and the front leg was used. The cat was allowed his freedom, would go out courting, sit on the fence and yowl as loud as any Thomas cat in town. The dog stayed pretty close in the drug store but would get out and run around on three legs whenever he so desired. The cat was killed at the end of nine weeks and the dog at the end of seventeen weeks. Every joint presented a normal appearance in both the cat and the dog, with the exception in the dog where the head of the humerus rested in the glenoid cavity there appeared to be a slight redness of the articular cartilage. There was far more atrophy of the dog's muscles than of the cat's. In all the joints the normal amount of synovial fluid was present and of the proper consistency. After removing the dressing the motion of all the joints were just as free and as perfect as in the opposite limb.

Now we have always been taught by all the great authors of surgery that if a joint is immobilized for any length of time ankylosis will certainly result, that motion is necessary to preserve the normal integrity of the joint, and that an inflamed jonit will become ankylosed if it is not moved. In fact, all our text-books on surgery proclaim with warning notes against immobilization in the treatment of fractures or inflamed joints. For instance, Agnew says begin movement of the joints in eight or ten days after a fracture and then movement of the joint every day thereafter. It was these, to my mind, erroneous propositions which led me to make the experiments referred to above, and the conclusion in my mind is clear, first, that motion is not necessary to preserve the normal functions of a joint. Second, a normal joint will not become ankylosed by simply immobilizing it for three or four months. Third, atrophy of the muscles of the limb will follow prolonged immobilization of a joint. Fourth, these ex-

* Read by title at the fifth annual convention of the C. M. & St. P. Ry. Surgical Association, Chicago, October 28 and 29, 1897.

periments have demonstrated to me conclusively that prolonged fixation will not produce ankylosis of a normal joint, and that motion is not essential for the preservation of normal functions.

Then the cause of ankylosis must depend upon pathological conditions and not upon fixation. It is claimed by the authors that motion in the treatment of inflamed joints prevents ankylosis. The reports of Shaffer in the New York Medical Journal show a series of 39 cases of inflammation of the knee-joint treated by motion. The result was in 19 complete ankylosis, in 6 motion, 10 to 44 degrees, in 7 motion complete. Six of the cases of free motion were treated in the first stages of the disease. To further test this question I sent a lady patient of mine who had suffered from knee-joint disease for two years to an osteopathist. I had fixed her knee perfectly with plaster-of-Paris for eight months. When I removed the cast there was no pain, she could walk with perfect ease and she had motion to about 45 degrees. The osteopathist flexed, rubbed systematically and moved the knee-joint for four weeks. This was done about ten months ago and to-day there is complete ankylosis.

I have two children suffering from knee-joint disease whose joints I immobilized eight months ago and placed them on a portable cot, a plan devised by Prof. A. M. Phelps of the Post-Graduate School of New York, which kept all the joints of the lower extremities in a fixed condition. Recent examination shows free motion in all the joints; even the inflamed joints are freely movable and cause no pain.

These cases I am willing to place on record as evidence against the theory of long rest and fixation being the cause of ankylosis. In the treatment of all wounds or inflamed joints my theory is to immobilize them and prevent all friction by absolute fixation. I believe motion of a joint is not necessary and can in no way prevent ankylosis, and it is a mystery to me how any surgeon can still persist in treating an inflamed joint by motion. The question of ankylosis, in my mind, is determined by the severity of the inflammation, the duration of the intra-articular pressure and destruction of periosteum. I believe that motion of an inflamed joint interferes with the process of repair and hastens ankylosis, and to prevent this calamity it is the duty of the surgeon to put the limb at absolute rest and relieve intra-articular pressure by extension and immobilization. Inflamed joints treated by absolute rest will furnish far fewer cases of ankylosis, better motion and less deformity. I have treated seven cases of fracture of the elbow-joint and three of the patella without ankylosis in a single case. I put them up in plaster cast and allow them to remain from eight to ten weeks without any passive motion. This allows the normal process of repair to take place without any interruption. I believe that motion would have resulted in breaking up new tissue formation and produced bony ankylosis or cicatricial contractions of the soft parts in a large majority of these cases.

Temporary Compression of the Aorta in Operations for Pelvic and Abdominal Tumors.

In connection with the details of a successful operation for double malignant ovarian tumors, with many adhesions, Lenander describes a method of digital intra-abdominal compression of the aorta which he employed with very gratifying results. The deductions which he draws from this case are the following:

1. A wide compression on the aorta above its bifurcation makes the entire true plevis practically bloodless.

2. If the common iliac artery is compressed on the vertebræ or the os sacrum above the sacro-iliac synchondrosis, the half of the pelvis is rendered nearly bloodless.

3. The compression was employed for three-quarters of an hour in this instance, with no serious effects; it should not be necessary longer.

4. When the compression ceases, a rapid lowering of the heart's action, due to vaso-motor dilatation, should be guarded against by a normal salt solution, intravenous injection.

5. In resections of the spleen or the extirpation of a fixed spleen, the arteria lienalis at the upper end of the spleen may be compressed against the vertebræ.

6. In severe and difficult operations upon the kidney, where the peritoneal cavity is necessarily opened, the compression of the renal vessels against the vertebræ will be of service.

The author adds a footnote of the fact, just discovered by him, that Senn had previously suggested intra-abdominal compression of the aorta in military surgery.—Bost. M. and S. Jour.

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TRAUMATIC PNEUMONIA.

While the fact that pneumonia may arise from external violence has been known for a considerable length of time, still this has not been sufficiently emphasized as yet by authors. Most text-books either neglect this question or dismiss it cursorily in a line or two; now medico-legal complications may arise in which this feature may prove important, and in any case it is a very interesting phase of an equally interesting disease. So no apology is necessary for presenting some details relative to traumatic pneumonia.

Litten a number of years ago stated that of 320 cases of pneumonia admitted into Frerich's wards during a period of six years, 14, or 4.4 per cent, were due to external violence, which he calls "contusion pneumonia." This mode of causation had been noticed before Litten's article, but he attracted special attention to it, and since this time a rather large number of cases have been recorded by other observers.

Thus Paterson (London Lancet, LXII, p. 136) narrates the histories of five such cases. In No. 1 a man, 47 years old, slid down from a hay rick and struck his left side violently against a cart. In fifteen hours he had a chill and the usual clinical pneumonia followed—rusty sputum, etc. Death ensued on the twenty-second day after the injury, and the nocropsy showed separation of the left seventh and eighth ribs from their cartilages, with hepatization on the same side. In No. 2 a man, aged 52, fell while walking and struck his right shoulder with great violence. The case terminated fatally and necropsy showed consolidation of the right upper and middle and part of the lower lobes. In case 3 a man of 66 fell on an icy pavement, striking on his left side and receiving a severe shaking up. Chills and fever followed, with dyspnea and crepitant râles. Recovery ultimately ensued. Case 4 concerned a teamster, 38 years old, who was struck on the left chest by the pole of his wagon. Here, too, chills, dyspnea and bloody sputum appeared and some dullness still persisted when he was discharged from the hospital. In No. 5 a man of 38 was severely bruised over the right side by the bank caving in while at work in a ditch. When admitted to the hospital he had severe pain on the same side, with dullness, crepitation and rusty sputum. Death occurred on the thirteenth day, and post-mortem examination revealed red hepatization of right side; no fractured ribs.

Mongour (Arch. Clin. de Bordeaux, October, 1894) also relates the histories of two similar cases. The first was in a man of 44, who was struck by a joist over the right chest. In a few hours he had difficult respiration, and on admission to the hospital three days later there was dullness and bronchial breathing over the region struck. Expectoration commenced two days after entrance. It was viscid and tenacious and contained great numbers of pneumococci, with a few streptococci; recovery ensued. In the second case a cavalryman, while mounting, struck the right side of the chest. In the evening he began to complain

of severe pain on the same side, and an attack of pleuro-pneumonia supervened. This author refers to a case by Petit in which a patient had a contusion of the chest, followed by a typical attack of lobar pneumonia. The sputum contained pneumococci in this case also.

Burton (British M. Jour., 1893, p. 1425) reports two cases in which pneumonia rapidly followed chest injuries, and Génin a case in a previously healthy man of 21, where a fall with injury to the right side of the chest induced pneumonia, terminating favorably.

Not all chest injuries are followed by pneumonia, for in a series of cases collected by Fraser, in nine fatal cases where the lung was wounded no pneumonia co-existed; in nine other fatal cases where the lung was not wounded one was complicated with pneumonia. As a rule, however, we may expect to find more or less traumatic pneumonia accompanying wounds or bruises of the lungs. Patients may sustain severe injuries to the chest without the lung being involved or, as may be seen from the case histories just given, a minimum amount of violence may result in severe inflammation. On the other hand, this form of pneumonia has followed a general shaking up in a railway accident, and in another case it complicated a strangulated hernia. Again traumatism seems occasionally to start the growth of the pneumococci elsewhere than in the lung, as in the case reported by Sokolowski. A boy injured the head and shoulder and complained afterward of severe pain about the right ear. The next day he became delirious and meningitis was diagnosed. On the fourth day symptoms of right apical pneumonia appeared and pneumococci were found in the sputum. The chest symptoms rapidly subsided, but the mastoid remained tender for some time.

Violence seems to act in the same manner as cold or damp weather by depressing the vital powers and lowering the resistance of the tissues to the activity of the germs. This view is confirmed by certain experiments with the pneumococcus in dogs and sheep. In these animals inoculation failed until a local lesion had been induced by the intra-tracheal injection of irritants, such as tartrated antimony. If there is any great effusion of blood in the injured part it will afford a choice pabulum for germs which are attracted to the spot.

Symptoms may be overshadowed by the other effects of the injury, and are usually insidious without genuine rigors, but with severe local pain, fever and dyspnea. The expectoration is rusty, as in ordinary pneumonia, or there may be hæmoptysis, and Litten thought that an unusual quantity of blood in the sputum was characteristic of pneumonia after injury.

The physical signs as a rule are confined to the wounded region and in addition to those found with hepatization in idiopathic pneumonia, we may have moist râles and gurgling sounds.

Litten insists on the good prognosis in uncomplicated cases, thus offering a strong contrast to the idiopathic variety. The course is usually rapid and the condition clears up quickly, resolution taking place at the end of a week or so. In rare cases pulmonary gangrene ensues or the formation of an abscess may occur, especially if a foreign body, as a piece of clothing, is carried into the wound.

The treatment will of course be confined to supporting the patient's strength. There is little field for surgical measures, save in case of abscess formation when evacuation of the pus, etc., will be indicated.

Radical Cure of Perforating Ulcer of the Extremity.

Chipault reports seven attempts to cure perforating ulcers of the foot by stretching of the plantar nerves, with only one failure. All of the patients were laborers, and the ulcerations were deep, and in some instances associated with osseous lesions. All were in bad hygienic condition. In every case the nerve was stretched either under the internal malleolus or external malleolus or at the border of the Achilles tendon; in a word, at a moderate distance from the trophic ulceration. At the same time that the nerve was stretched, the ulcer was thoroughly curetted, necrotic bone removed, and the thickened edges of the ulcer excised, thus transforming a round infected ulceration into an oval wound, whose edges were sutured together. In this manner the most obstinate cases may be successfully treated.—Bost. M. and S. Jour.

The injection of a glass syringeful of lemon juice into the nose, after it has been cleaned of clots, will stop bleeding after everything else has failed.—Med. Summary.

Translations.

Direct Subcutaneous Ruptures of Large Arteries with Consecutive Gangrene.

By Felix Lejars.

(Continued from Page 89.)

Evolution—Whether it be rapid or slow, traumatic occlusion of the large arteries sometimes heals without any grave accidents; it is, however, generally followed by gangrene of varying form and extent.

Healing Without Gangrene.—It is interesting to note that even after an arterial attrition, followed by complete thrombosis and manifested by absence of the pulse and other signs referred to previously, recovery is possible without any trace of peripheral mortification, leaving nothing behind save a more or less marked weakness of the member.

Consecutive Gangrene.—We should not forget which is the most frequent sequel, for the examples cited are the only ones where the slough was lacking. Two principal forms may be distinguished. 1. Gangrene en masse, generally of the moist variety and invasive. 2. Peripheral gangrene, circumscribed, generally of the dry variety and appearing slowly.

The first form or gangrene en masse is precocious in appearance; it increases and quickly traverses the length of the limb. These cases are often complicated by grave septic phenomena and nearly always necessitate a large sacrifice, speedily practiced. The signs of sphacelation are often manifested in the first few days, in Cival's case a cannoneer was wounded on June 23d; on the 25th the pain became excessive, phlyctenulæ more and more numerous, and the vinous discoloration of the skin had extended to the lower half of the leg. The development or exaggeration of the pain often "signalizes" this extension of the sphacelus, the violet marblings, and especially the phlyctenulæ are the best indices. Finally, it is an invading gangrene.

The circumscribed dry form of gangrene, such as was present in our patient, is less alarming. The sphacelation begins in the fingers or in the toes, which turn black, become dry and shriveled up. It is extremely irregular in its distribution, and while it is rare for a finger or toe to remain uninvolved, the process is not equally far advanced in all the fingers or toes. The gangrene of the skin often extends higher up than that of the deeper structures. Lastly, its evolution is, as a rule, extremely slow.

PROGNOSIS.

In giving a prognosis we must not forget the long, very long, delay before anatomical and functional restoration is complete. A guarded prognosis must be given, even if the local lesions appear slight and signs of obliteration are lacking at first. The variety of recoveries and of retarded gangrene must be borne in mind. The large, moist, invasive forms should cause great anxiety, and if the patient's life is to be saved they often necessitate the prompt sacrifice of the limb.

TREATMENT.

If called in at the first, when the absence of the pulse, paleness, coldness, etc., are manifest, there are two precautions which should not be neglected, to envelop (but not to compress) the limb in a thick layer of cotton, kept in place by a few turns of a bandage, and scrupulous disinfection of the skin. Cleansing the skin thoroughly with soap and water, then with alcohol, and an antiseptic solution, and enveloping the limb in sterile compresses are methods which, while easy of execution, often prevent serious after-effects. Brümmer attributes the localization of the sphacelus in his case and the absence of all septic complications to this immediate disinfection, and in our own case we are convinced that these aseptic envelopes applied from the beginning had much to do with the successful result. The gangrenous phlegmons, which have placed many patients' lives in danger, undoubtedly begin in small superficial wounds, apparently of no importance, but which allow the entrance of micro-organisms. If we are not able to give the blood free passage through the obstructed vessel, we may help the establishment of the collateral circulation by means of prolonged hot baths.

Active surgical intervention may be sometimes indicated. The bad effects of the ruptures are due not so much to the localized trauma as to the extended thrombosis following them and the compression caused by the bloody effusion which prevents the return of circulation in the small vessels. This being

the case, it will prove beneficial to open the hemorrhagic foyer (if the case is seen early enough) to evacuate it, clean it out and tie the ruptured vessel, to act, in short, as we would in case of a diffuse aneurism. The larger the effusion the more this intervention seems called for. Early ligation of the vessel prevents peripheral embolism, as Picou has pointed out.

At a later epoch the measures to be instituted will depend on the character of the gangrene. In the massive form, especially if fever and septic phenomena have appeared, high amputation is the only resource; even this does not always suffice, for gangrene in the stump has sometimes been observed. In less alarming cases embalming, combined, if necessary, with large incisions, injections of very hot boiled water, and enveloping in compresses wet with alcohol will often give unlooked-for results. If the gangrene is dry and circumscribed primary amputation is never indicated, and we will always get the best results by waiting patiently without any intervention. After a considerable interval, and when the line of demarcation is well established, it may be advisable to remove the gangrenous tissues by the aid of a bistoury and scissors.

Miscellany.

The Muskoka Trip.

A very enjoyable sequel to the annual convention was the excursion to the Muskoka Lake region, tendered by the Grand Trunk Railroad and the Muskoka Navigation Company, on Saturday after the meeting adjourned.

The special train, which was made up of seven vestibuled coaches, started from the union station at 7:30 a. m. The cars were all brand new and had never been used before, having just come from the Pullman shops, and the engine was gaily decorated with bunting and flowers. The run to Muskoka wharf at Gravenhurst was quickly made and the party embarked on the steamer Medora. There was a rather stiff northwest wind blowing, which impeded progress somewhat. However, after passing through the lock at Port Carling, Port Sandfield was reached about 2 o'clock and dinner was served at the Prospect House. Some of the party, who loitered on the way to the hotel botanizing, etc., were recalled to life by the tooting of the boat's whistle for the return trip, and had to content themselves with a "hand out." One southern representative created considerable amusement by rushing down the gang plank with a huge sandwich in each hand, from which he bit alternately as he ran. All the estrays were finally collected and the boat retraced its way to Gravenhurst. Just as the boat touched the wharf the following resolutions were handed to Capt. A. P. Cockburn, the genial manager of the Muskoka Navigation Company:

"We, the undersigned, in behalf of the members and guests of the International Association of Railway Surgeons, desire to express to Mr. A. P. Cockburn our heartiest thanks and appreciation for his great courtesy in placing the steamer Medora at the service of the association for the splendid trip from Gravenhurst to Port Sandfield and return. We feel that we cannot adequately express the very great enjoyment that we have experienced on this excursion through one of the most deservedly celebrated scenic routes in North America.

"We beg that he will be the medium of conveying to Capt. Bailey, Purser McKinnon and crew, the assurance of our appreciative recognition of the large part that they have contributed to our entertainment by their unremitting attention and provision for our every want."

Dr. Campbell of Gravenhurst then read and presented the following address to Dr. Ross, the retiring president of the association:

"On behalf of the citizens of the town of Gravenhurst, at the foot of navigation on the Muskoka Lakes, we beg to extend to you a most cordial greeting:

"We trust sincerely that your flying visit to our charming lakes, accompanied, as we are most happy to notice, by so many of our fair cousins from across the border, may prove one of unmitigated pleasure to you all.

"You will, we trust, by personal observation, pardon any apparent display of pride or boasting, if we claim for our district and especially for our own immediate neighborhood, very many of the more excellent qualities which go to make up the ideal summer resort.

"For seekers after health and pleasure our climate is indeed salubrious to a degree. Our water is abundant, pure and refreshing. Our soil is porous, and our surface drainage natural and effective, so that such dread scourges as typhoid fever, epidemic and endemic diseases are of exceedingly rare occurence.

"Our facilities for enjoyment are also conspicuous. Railway communication with Toronto and other Canadian cities and towns is easy and frequent. The Muskoka Navigation Company's well appointed fleet of steamers, under the able direction of the veteran manager, Mr. A. P. Cockburn, reaches every point of interest of our lakes at stated intervals, and finally our citizens generally, headed by our mayor and corporation officials, always hold themselves in readiness to do all in their power to welcome and assist any and all who may come among us to enjoy themselves to the fullest extent.

"Wishing you all a safe return to your distant homes, with the heartiest possible invitation to return at your earliest good pleasure."

Signed by Jos. Clairmont, Dr. Cornell and Dr. Campbell, on behalf of the citizens.

During the return trip on the train a copy of the following resolutions were written out on one of the souvenir programmes and presented to Mr. Dickson of the Grand Trunk Railroad:

"Resolved, That the thanks of the members of the International Association of Railway Surgeons are due, and are hereby most cordially extended, to Mr. M. C. Dickson, District Passenger Agent of the Grand Trunk Railway at Toronto, Ont., for his untiring attention and courtesy to the members and their friends on the occasion of their annual meeting in Toronto, July 6-9, 1898."

The party reached Toronto in time to make connection with the late trains for Montreal and Chicago.

New York Polyclinic is authority for the statement that a German army surgeon claims that in a large number of "sprains" of the ankle-joints the Rontgen ray showed that in the majority of cases there was actually either fracture or dislocation of some one or more of the small bones. The treatment should be fixation, in order to prevent false joints, exostoses, etc., leaving permanent impairment of functions.

Extracts and Abstracts.

The Value of Surgery in Nervous Diseases.

By Henry Waldo Coe, M. D.

It was as late as 1884 that a leading surgeon of America, in the greatest surgical work of that day,[1] commenting on the value of cerebral localization, had this to say: "There are already on record at least five cases in which success, as regards the discovery of the lesions, has attended an operation guided by cerebral localization, and in three of these cases the patients have recovered or been relieved." To the majority of us who have been long in practice it may not be unprofitable to take a retrospective view of the science of surgery of the brain, since it is the type of surgery of the nervous system, and to compare earlier opinions and methods with those of to-day, and I think that we must agree that in no field of the general science of medicine are the changes of modern times so vividly manifest as in the department devoted to the relief of diseases of the nervous system by surgical measures. It is safe to say to-day, thirteen years after the foregoing was published, that ten thousand operations, guided by cerebral localization, have been performed, and more than likely such a number has been recorded during the present year. The foregoing writer, fearing that the enthusiasm manifested by him might be deemed irrational or visionary, felt it incumbent upon him to also say: "Let no one think that I am contending that cerebral localization can be frequently available for surgical purposes as indicating an operation. This must be comparatively rare, although I believe that confidence resulting from more extended experience will, in the future, lead to more frequent interference." In the brief lapse of time since the foregoing was written cerebral localization has developed, until it is now considered not only valuable, but preliminary, to a vast number of surgical procedures upon the brain, in fact, absolutely essential for the procurement of that brilliancy in results which so frequently follows its employment.

Certain localized areas of the cerebral cortex were believed to possess peculiar or partial control over definite groups of muscles, although there was much dispute and discussion over this question, and not until the great French master of neurology,[2] in 1883, laid down the dictum, "There does not yet exist a single accurate observation of a destructive lesion (of the brain), outside of the motor area, having produced permanent paralysis of the

1 Nancrede, Chas. B. Int. Ency. of Surgery, 1884.
2 Charcot.

opposite side of the body, nor does there exist a single accurate observation of a destructive lesion of any such convolution which has not given rise to permanent paralysis of the opposite side of the body," did brain localization begin to assume the important position toward which it had been slowly advancing during the past. While we may make some immaterial modifications of the form, but not the spirit, of the foregoing proposition, upon the whole, it stands to-day as the foremost, if not the first, clear enunciation of the basic truth of localization, proceeding from which there has been developed later and more positive knowledge regarding the intricate afferent sensory mechanism, as well as a more complete knowledge of the minutiæ of the muscle control.

This paper cannot mention all the disorders of the nervous system for which the methods of modern surgery are applicable, but gives a few instances only as illustrative of the reliance which neurologists of to-day place in surgical intervention. It is not my intention to appear as an advocate of surgery for nervous diseases in contradiction to their medical treatment, but to remind you that in some cases of these diseases there are ofttimes conditions which indicate that neurological medicine should give way to neurological surgery, and in what is here said, recent authorities alone can be referred to.

While speaking on the subject of surgery for nervous diseases, it is well also to remember the influence possessed by the nervous system in the outcome of surgical operations of all kinds. In the language of Moyer,[3] we should remember "the great importance of the nervous system in surgical work, and that a due appreciation of it is an important factor in preventing mortality and in realizing that full benefit of operative work—a restoration to health." It can scarcely fail to afford us satisfaction to compare the mortality rate of brain operations thirteen years ago with that of the present day. The older writers, Blohm, Otis, Pirogoff and others, gave the mortality of trephining operations at from 51.25 to 70 per cent, but the writer before mentioned,[4] speaking of the uselessness of former vital statistics upon the subject, gives the mortality from such surgical procedures per se at from 10.69 to 15.29 per cent, after excluding mortality risk from the concomitant pathological conditions which have indicated operation. The author recently[4] pointed out that in a series of secondary operations for traumatic epilepsy, performed by him, the mortality had been nil and serious symptoms unknown, and this is practically the result obtained by all operators of much experience during such time. This demonstrates that not only has almost complete immunity from danger been reached in these cases, but that this greatly advanced position has been reached only during the past few years.

Exophthalmic goitre is one of the nervous diseases for which surgery has recently offered relief. Resection of the cervical sympathetic has been done of late, and the present year has more than doubled the recorded cases treated in this manner. Among other recent writers, Jaboulay[5] reports three cases under his care where the favorable results were immediate and striking. This operation is certainly less bloody and not more difficult than thyroidectomy, but the latter operation has more friends than the former in this country. The danger to life is not material in resection, but those of you who have operated on the thyroid gland will agree with me that thyroidectomy is one of the bloodiest operations known to surgery. I think, not having experimented upon the cadaver or searched upon the living subject for this nerve, that its resection would be somewhat difficult. This operation is mentioned because it is new, although until more light is shed upon the subject I believe that I shall adhere to the older procedure, and, in fact, am now preparing a case for thyroidectomy.

Beck's[6] report of seventy-six operations for brain abscess is perhaps a fair estimate of reasonable results in a condition where hope alone is offered by the surgeon's hands. Thirty-six of these cases were for traumatic abscess, of which twenty-three recovered. Of the total seventy-six cases operated upon forty recovered. In thirty of the traumatic cases exploratory punctures were first made for diagnostic purposes, followed by excision and drainage. The recoveries were mostly from cases of abscess in the temporal region.

Many neuropathic conditions are found to have their origin in irritated nerve trunks, which are bound down in dense adhesions or by cicatricial tissue, where operative procedures alone offer a solution of the difficulty. Some practitioners are inclined to the belief that the gynæcologists of the past have, in their enthusiasm, magnified the importance of operations for adhesions within the abdominal cavity, and while there may be some truth in the belief, yet the numerous cases which have come under the observation of nearly every practitioner of medicine where removal of the constant tension upon the great nervous supply of the abdominal and pelvic viscera, both spinal and sympathetic, by abdominal section has afforded relief, can scarcely fail to convince that there is much in the assumption of these careful operators for such cases.

3 Moyer, Harold N. Medicine, July, 1897.
4 Coe, Henry W. Indications for Brain Surgery. Medical Sentinel, December, 1897.
5 Jaboulay. Exophthalmic Goitre. Lyon Medical, February 7, 1897.
6 Beck. Dennis' Surgery, 1895.

By the removal of tension from constricting bands in the deeper tissues of the limb following rheumatic, gouty or other inflammatory states, relief from persistent neuralgias and in some cases local paralysis, are among the brilliant results obtained by the surgeon. A persistent burning neuralgic distress, the area of greatest intensity being somewhat definitely located in the sciatic or other nerve trunk, has led me to make an exploratory incision in two instances. In one a well-marked cicatricial contracture of the epineurium was discovered, which was freed by careful dissection longitudinal to the nerve trunk, while in the other no lesion was discovered. The pain ceased promptly and permanently in the second case, while in the first relief came only after weeks of general treatment. It has been urged in these two cases that the one having the lesser amount of surgery did better, and therefore none at all would have been best. Answering this, I have pointed out, as I do now, that the recovery in the second case was undoubtedly the result of the operation, this result being produced perhaps by the manipulation of the nerve trunk during the examination and by radical counter irritation in other tissues, incident to the operation. The ultimate recovery, although somewhat delayed, of the first case with a useful limb, was, I believe, largely due to the operation upon the contrited sheath, and the patient was ever grateful that it had been done.

A patient was referred to me for a persistent neuralgia of a mild type affecting the right shoulder. Upon careful examination it was discovered that he was subject to periodic attacks of purulent otitis media, and the case was referred back to the doctor, who sent it to me, who was himself a surgeon, with the advice that radical surgical measures for the relief of the ear trouble should be instituted. Under appropriate treatment, which included the removal of the ossicles, the patient recovered from his neuralgia. A somewhat similar case has just come under my observation, where the patient had a minute sinus over the inferior maxilla, and the exciting cause of the neuralgia is undoubtedly due to a carious tooth. It should be remembered that the branches of the fifth nerve are distributed to the shoulder, and caries of the ossicles of the middle ear and of the bones of the face should be carefully looked for when the persistent pain of a mild character exists in this region.

Resection and implantation of nerve trunks are among the striking modern achievements and are of much interest to me, although I have never yet done an implantation. I remember the case of a gunshot wound of the axilla, the first patient suffering from a serious accident for which I had the responsibility of treatment. He was a boy 16 years old, who, in dragging a double-barrel shotgun from a boat, discharged both barrels into the right axilla. The skin, muscular tissues, blood-vessels and other soft parts, including the brachial artery, had been torn away, and I can yet remember with what feeling of responsibility I examined this ghastly wound, and a realization has ever since been present, which was then forced upon me, that the practice of surgery in the country, away from immediate and competent assistance, is the most exacting position into which any of us can be placed, and which fact gives me a feeling of respect of the highest character for the suburban practitioner, the older members of which have always had my reverence, and the sentiment below my admiration:

"In the nighttime or the daytime he would
rally brave and well,
Though the summer lark was fifing, or the
frozen lances fell;
Knowing if he won the battle, they would
praise their Maker's name,
Knowing if he lost the battle, then the doctor
was to blame.
'Twas the brave old virtuous doctor,
'Twas the good old faulty doctor,
'Twas the faithful country doctor—
Fighting stoutly all the same."
—Carleton.

I recall the appearance of branches of the brachial plexus dangling in the wound, some punctured and mangled and others sundered entirely. Asepsis was then unknown in the treatment of such a wound, and while resection of these nerve trunks, even under present methods, would have given only a hope of recovery, yet the main en griffe which the patient had a few years later has been one of the nightmares which has marred for me the pleasant memories of general surgery. If nerve implantation and asepsis had then been in vogue it is possible that much of this deformity would have been prevented and a re-entry of nervous impulses established over an extension of axis cylinders, sent out from the stump ends of the nerve trunks through the transplanted foreign segment, acting as a guide to the process of stimulated nerve repair in such cases. I think that we can no longer assume that the implanted portion of nerve trunk, with its axis cylinders, become part and parcel of the tract into which it had been transplanted, after the numerous, careful, and well authenticated experiments, and the report[7] of Dr. G. Carl Huber of the University of Michigan, which show that the foreign body simply acts as a well-directed truss apparatus for nerve building, and that it is itself replaced by terminal prolongations from the old nerve trunk ends. Regardless of what the process of repair may be, however, the methods mentioned are of great practical value.

7 Huber, G. Carl. International Journal of Surgery April, 1897.

The local treatment of neuralgia by saturation of the tissues through cataphoresis is a surgical procedure, as contradistinctive from the internal and medical treatment of this affection. In a former paper[8] reference was made to an appliance devised by me for the use of various substances in solution for this method of medication. The hopeful view then expressed, two years ago, is now emphasized, and a paper is now in process of construction in which several cases, markedly chronic and intractible, will be reported where other methods had been employed without success, but where relief followed cataphoresis. It is especially applicable in the treatment of supraorbital neuralgia, and consists in an electrolytic saturation of the nerve trunks and fibers with the minutest amounts of medicament in appropriate strength. For intractable neuralgia neurotomy has had its day and neurectasy has at present few advocates. For neuralgia of the fifth cranial nerve, where persistent internal and electrical treatment have proven unavailing, neurectomy should be employed.

In January, 1896, Keen[9] reported six cases of resection of the Gasserian ganglion for trifacial neuralgia, in two of which there was some recurrence of the pain. This report from an operator of such ability and skill should teach us that we ought to be careful in the selection of cases for operations, for the mortality rate is about 15 per cent, yet the proportion of recurrences is in Keen's cases remarkably high, for in about one hundred other recorded operations not 10 per cent have shown a return of the pain. Neurectomy for trifacial neuralgia at the three principal foramina, with cautery to the nerve ends, according to the methods of Tansini,[10] may be given trial. It has the advantage of being devoid of danger, and the paper referred to reports success after its employment. After such treatment, if there should be any recurrence of the distressing symptoms, the graver procedures can be promptly invoked, with the knowledge that the patient's general health has not suffered by the delay. The ligation of the common carotid artery, as reported[11] by Dr. B. M. Ricketts for trifacial neuralgia will not, I believe, meet with much favor.

Unfortunately, in most conditions indicating neurectomy other than about the face, the consequent paralysis is such a serious matter that we must always feel like hesitating before adopting such a procedure. A case under my observation at this time is in point. A man, aged 34, single, good family and personal history; occupation, farmer; referred to me by Dr. D. H. Rand of Portland has a tumor involving three collateral branches of the median nerve in the palm of the hand. There is almost complete paralysis of the muscles supplied by these nerve divisions. The tumor is the size of a small bean, is tender upon pressure, and there is considerable pain in the fingers. Iodids and mercury internally and oleate of mercury locally have been given thorough trial, and an attempt has been made to reduce the tumor by galvano puncture. If there is no further improvement in the case during the next few weeks an exploratory incision will be made, and if exsection is found to be necessary implantation or artificial neural anastomosis will be employed. If re-establishment of nerve continuity and impulse fails, amputation of the finger most involved will be done.

At the session of the American Neurological Association, held in Washington, D. C., May, 1897, a paper was presented upon "Spasmodic Torticollis." Dr. Walton says[12] that treatment other than operative is ineffectual in well established cases and that operations for this affection have usually been too limited than too extensive. He advocates the resection of the spinal accessory and the three first posterior branches of the cervical nerves, and also exsection of the affected muscles, and he believes that while absolute cure cannot be expected in over one-half the cases, improvement in a great majority of cases does occur. While able authorities who discussed the treatment of this affection did not take so roseate a view of operative treatment as did Dr. Walton, yet it was conceded that as radical and complete work had not been done by others, and the medical care of such cases was acknowledged to be unsatisfactory in most cases. The danger of the operation is scarcely worth considering, although the degree of skill required upon the part of the operator is not meager. Upon a private patient of Dr. H. M. Biggs, upon whom I saw Dr. Joseph Bryant operate at St. Vincent's Hospital, in New York, where the involvement appeared to be manifested altogether in the sterno-cleido-mastoid, and in which neurectomy was done upon the spinal accessory nerve, the movements seemed exaggerated after the operation, even while the patient was yet under the influence of the anæsthetic. I have been informed that this patient, who was confined to his bed for many weeks, and whose head was made immobile by plaster bandages, ultimately recovered. The choreic habit evidently had much to do with the post-operative manifestations in this case, the association muscles having, perhaps, taken up the work of their former active and then disabled fellow. Rest, counter irritation, fixed immobility, and

8 Coe, Henry W. Treatment of Neuralgia. Medical Sentinel, 1896.
9 Keen, W. W. American Journal of Medical Sciences, January, 1896.
10 Tansini, B. British Medical Journal, March 16, 1895.
11 Ricketts, B. M. Journal of American Medical Association, October 2, 1897.
12 Walton, W. Spasmodic Torticollis. Journal of Nervous and Mental Diseases, December, 1897.

other mechanical processes, together with electricity and internal medication, were advocated in the discussion of Dr. Walton's paper before referred to, and the advice to try everything else before the evokement of radical surgical methods was no doubt proper, but in view of the hopelessness in most cases from such treatment, it would appear to be advisable that operative surgery should be given a moderately early trial.

Before a general practice had been cut down to embrace only neurology along medical and surgical lines, several cases of spasmodic torticollis came under my observation, as they do under the care of every general practitioner who has been in the professional harness for some years, and in these and others since, the usually prescribed and classical methods of non-surgical treatment have been employed, and I have so far failed to see a single one of these cases recover, and in the future shall not hesitate to early employ the knife. A case in my service three years ago, while neurologist at Portland Hospital, referred to me by Dr. C. J. Smith of Pendleton, Ore., and another outside of hospital care, referred to me by Dr. Richmond Kelly of Portland, Ore., possessed in each case opportunities for employment of special care and patience, where conscientious technique was maintained along non-surgical lines for long periods of time, yet the improvement which followed such care early vanished when the ordinary affairs of life had again been resumed.

"Pressure and compression are mechanical agencies and not pathological conditions," says Phelps[13] in his work on "Tramuatic Injuries of the Brain," published a couple of months ago, but we may add that pressure and compression allowed to remain quickly produce pathological conditions, and medical aid has often been invoked for relief from these mechanical agencies when surgical procedures should have been promptly instituted.

Laplace, in a paper[14] read before the American Medical Association, dwells upon this matter, and says that in brain derangements, "in the vast majority of instances, pressure is the cause of this interference of function, cerebration, etc., and relief or restoration of function will depend upon our ability to diminish or entirely remove the permanent or transitory compression." The methods employed in his scheme of brain drainage is a transverse craniectomy, removing a strip of bone a quarter of an inch wide, and the incision of the dura through the opening thus made from temporal to temporal region, except over the superior longitudinal sinus. Strips of gauze are then placed in the opening in the dura and the skin sutured loosely over them, permitting free drainage of the subdural fluid. Upon the subsidence of pressure symptoms, or in about eight days following the operation, the gauze is withdrawn, the dura sutured, and the wound closed throughout.

Laplace refers to the well-known fact that mere irritation of the scalp and adjacent tissues in a brain operation will often produce beneficial results. Fifteen cases of epilepsy are reported in the paper where no focal lesions were found, yet improvemnt, markd by lessened seizures, occurred in six cases, while the mental condition was improved in all. Insanity and microcephalus, after the methods of Lannelongue, have promise of relief from similar operations, rare though these recoveries may be. In microcephalus, rather than the fanciful incisions depicted and advised by some authors, it is better to seek to re-establish lines of opening as near the normal sutures as possible, and from the two cases which have come under my own observation, I believe that the fissures as usually made are too narrow, and that they should not be less than an inch in width.

Puncture of the cerebral or spinal subdural and subarachnoid spaces will be sufficiently radical to meet my views in most, if not all, of the cases reported as operated upon by Laplace in the paper before mentioned. He speaks of operations for adhesions between the dura and brain, but in the extensive drainage operation which he employs and advocates there is provided a cicatricial band a half inch in width, almost encircling the brain. This does not seem to me to be justifiable, with puncture and temporary or permanent drainage, thereby readily attainable by a method superior, in being largely devoid of danger. If the transcranial method of drainage is to be employed, although a cicatrix cannot be avoided, adhesions might be largely minimized by the employment, as I have done in brain cases, after the method advocated by Park, of a thin strip of gold foil between the membranes. After eight days of open drainage the dissection which would be necessary for the employment of the foil would not be inconsiderable.

In 1894, at a meeting of the New York Neurological Association, I remember to have heard a paper by Dr. George W. Jacoby upon the subject of spinal puncture. The author referred to cases where puncture had been made and urged its use in many classes of cases, especially for hæmorrhage of the cord, cerebral congestion and tubercular or purulent leptomeningitis. He advocated in certain cases that an opening should be made in the cerebral subdural space, and, if I remember correctly, in special cases, into the lateral ventricle. A counter opening was advised in the spinal subdural space in the lumbar region,

13 Phelps, Chas. Traumatic Injuries of the Brain, 1897.
14 Laplace, E. Improvement of Brain Function by Surgical Interference. Journal of American Medical Association, October 2, 1897.

and through the channel between these openings borated or other antiseptically prepared solutions were to be carried, irrigating the cavities of the products of irritation therein contained. I feel myself still under obligation to Dr. B. Sachs of New York for the courtesy of an invitation to see, one evening, a case under his care, in which Dr. Frederick Dennis did a lumbar puncture for diagnostic purposes in a man suffering from persistent and increasing pain, resulting from which puncture, in connection with other symptoms present, a tumor of the cord was diagnosed.

Dr. Charles L. Dana,[15] under the title of what he has denominated "Acute Serous Meningitis" (wet brain), records spinal puncture done by him in fifteen cases, with amelioration of the symptoms in most cases and with no bad results. In one case prompt and full recovery followed. As these alcoholics are usually already in extremis from the destructive character of their habits and modes of life, and many are sufferers from concurrent maladies, it is not surprising that most of these cases early succumb whether or not puncture is employed. The improvement reported in all these cases, with no ill consequences in any, will no doubt lead to more general employment of this method.

Dr. L. Schroeter of Buffalo gives a report[16] of the employment of cerebral puncture of the head in three cases of large hydrocephalus in unborn infants, where delivery of the enlarged head had been found to be impossible. Aspiration permits delivery, and the child is given a chance for life. It occurs to me that in case of breech presentation, common in such conditions, the accoucheur might with propriety do a lumbar puncture at an appropriate moment in the process of expulsion, and then to be able to deliver without version.

Macdonald, in his excellent text-book,[17] just from the printer's hands, quotes Hildebrand's statics, showing 66 per cent of recoveries after Morton's injection method for the treatment of spina bifida, and 73.5 per cent of recoveries after the operation of exsection, which evinces a marked improvement in these later years in results following surgery for this condition, and warrants the latter method in applicable cases. After excision a celluloid plate may be inserted into the wound, as advocated[18] by Roswell Park.

In a case of chronic hydrocephalus manifested in a child at 10 years of age, following one year after an injury to the head, I have done lumbar puncture upon two occasions. The first time 45 cc. of cerebrospinal fluid was removed, while at the second puncture a much smaller quantity was taken, although free opening was provided. The size of the head in this case, although above the normal, was not great, measuring 57 cm. in circumference. Six weeks after the first puncture the circumference was 56.5 cm., indicating to me that following the withdrawal of the fluid of pressure, reparative changes were permitted and that the membranes had ceased to hypersecrete in a case where increase in the size of the head had previously been rapid. The case is still under my observation.—West. Med. Rev.

15 Dana, Chas. L. Acute Serous Meningitis. Medical Record, December 4, 1897.
16 Schroeter, L. Report of Three Cases of Hydrocephalus. Buffalo Medical Journal, November, 1897.
17 Macdonald. Surgical Diagnosis and Treatment, 1897.
18 Park, Roswell. Surgery by American Authors. 806.

An International Episode.

The meeting of the International Association of Railway Surgeons, which has just concluded its sessions, marked the end of its labors by a direct and significant compliment to Canada. Our fellow citizen, Dr. Bruce L. Riordan, who stood to them as the representative of the welcome which they had received, was elected president, and the choice was plainly intended as a mark of the feeling of international friendship which the meeting elicited. Dr. Riordan's competitor for the high position of chief officer of this influential and eminent body was Dr. A. I. Bouffleur of Chicago, a gentleman who possesses extremely high standing in his profession, who has rendered great services to the association and who is exceedingly popular. Yet Dr. Riordan's majority was conclusive; it is pleasant to be able to add that Dr. Bouffleur's bearing under his defeat was most graceful, and that the manner in which he presented his successful rival to the association went far to explain why he is so well liked.

This incident supplies the keynote of the whole meeting. The railway surgeons proved themselves an uncommonly hardworking body of men, who devoted themselves with zeal to the working out of professional problems; but to outsiders the interest in their gathering must be the exceptional manner in which our guests came to understand and sympathize with what may be called the international mission of Canada. Canadian hospitality means something, and under the guidance of Dr. Riordan and his assistants Canadian hospitality never has been more complete or more considerable. Our visitors, some 800 in all, men of standing in their homes, came principally from the South and the Middle West, portions of the United States which come least into contact with Canada. They came with a new-found sentiment of regard for the Great Britain which had done their country so material a service in the present complications. They were delighted with the welcome extended to them, and it is not too much to say that the cordial words of sympathy which were uttered on the

occasion of their formal meeting of welcome, and which reached a climax in the noble speech of Hon. Geo. W. Ross, made a profound impression upon them. Several hundred influential Americans are now going to their homes with a warm feeling of regard for Canada as a part of the British Empire.

This is no light thing. Few of any of the numerous international conventions which have met here have had so good an opportunity of studying comparative politics as our professional visitors enjoyed. International subjects were in the air. Canada's position in the empire, the exceeding great contentment of Canadians with their partnership with Britain, the practical friendship of Great Britain for her daughter nation, the cordial willingness of Canada to be a connecting link, were all borne in upon them in a hundred ways. There was much private conversation as to the ideals of Canadians between the visitors and their hosts, and a frank and wholly beneficial interchange of views. That the Americans felt that they were hospitably entertained and that they looked upon Canada in a new light was made abundantly plain, and we can but be sincerely glad that they have made our acquaintance and hope that many more will come to know us as well.—Toronto Globe.

A Case of Acute Traumatic Tetanus Cured by Antitetanic Serum.

Dr. J. W. Foster, in The Therapeutic Gazette, reports the following case: On June 28, 1897, I was called to see Clotelia G., colored, fifteen years old. The patient one week previously had run a nail into the sole of the left foot. There was slight contraction of the masseter and temporal muscles, but no pain, no fever, and the pulse was normal. A cathartic was given and further developments were awaited.

June 29th, 8 p. m. Condition about the same.

June 30th, 8 a. m. Pulse 100, temperature 100° F., slight rigidity of the cervical muscles. Ten grains chloral every two hours. Calomel to move bowels.

July 1st, 8 a. m. Patient was restless; pulse 110, temperature 99½°.

July 2d, 8 a. m. Dorsal and abdominal muscles showed signs of rigidity. Given a combination of chloral, potassium bromide, extract Indian cannabis; and extract hyoscyamus every two hours; patient refused third dose. Pulse 100; temperature normal.

July 3d, 8 a. m. Slight pains in the limbs, with more rigidity; facial muscles contracted; no fever; bowels moved. At 4 p. m. gave ten cubic centimeters, Parke, Davis & Co.'s antitetanic serum; no rise in temperature. At 8 p. m., ten cubic centimeters antitetanic serum.

July 4th, 8 a. m. Rested better through the night; ten cubic centimeters serum. Slept two hours. Took first nourishment—milk, cream and whisky. At 2 p. m., more restlessness; no fever; pulse, 100. At 8 p. m. conditions were about the same.

July 5th, 8 a. m. Pulse 110, temperature, 99½°; considerable pain throughout whole body, one-sixth grain morphine hypodermically; after that, slept some. Took more nourishment—cream, milk, beef broth. At 4 p. m., pulse was 110, temperature 99½°; ten cubic centimeters serum; quite rigid, but spasms not so pronounced. More serum at 9 p. m. Pulse 114, temperature 100°; one-sixth grain morphine.

July 6th. Rested fairly well during night. At 7 p. m., pulse 116, temperature 101°. Bowels moved freely during the day. Ordered tepid baths every two hours to control fever. Spasms more marked on left side, chiefly in hip and leg; muscles of deglutition somewhat involved; quite difficult to swallow without strangling. Spasms lasted from one to two and a half minutes with intervals of three or four minutes. Any undue noise provoked a paroxysm.

July 7th, 8 a. m. Passed a fair night; pulse 130, temperature 101°; ten cubic centimeters of serum. Paroxysm lighter; intervals of five minutes. Ten cubic centimeters at 12 and 7 p. m. Rather restless during the day; pulse 120, temperature 101½°; one-sixth grain morphine.

July 8th, 8 a. m. Rested fairly well during the night; pulse 120, temperature 100°. Still continued sponge baths every two or three hours. Paroxysms less frequent; duration thirty seconds; intervals of half an hour.

July 9th, 7 a. m. Rested badly during night; pulse 110, temperature 100°. Rested better during day. Bowels moved kindly. Took milk, cream, chicken broth. Kept up sponge-baths.

July 10th, 7 a. m. Rested fairly well during night; pulse 110, temperature 99°. No medicine, but half a drachm of the bromide mixture mentioned above every four to six hours. Rested quite well during day. Took nourishment freely. At 7 p. m. pulse was 120, temperature 99°.

July 11, 8 a. m. Rather restless during night; appetite fair; beef broth with cream. Pulse 110, temperature 98°.

July 12th, 8 a. m. Slept well Sunday night. Muscles of arm and chest somewhat relaxed, but quite a good deal of rigidity of whole body; bowels moved kindly.

From this the patient made a rapid recovery. This being the fourteenth day, I only visited the case every three or four days. At the end of the third week standing and walk-

ing were possible; at the end of the fourth week the patient came down to my office perfectly well.

To summarize: The disease reached its climax about the tenth day, then gradually subsided. Highest pulse rate 130; highest temperature, 102°. Very little medicine was given. On the 3d of July, Dr. John Punton and Dr. G. O. Coffin were called in consultation and it was decided to begin the use of Parke, Davis & Co.'s antitetanic serum; only three bottles were used during the treatment of the case. There was great difficulty of breathing part of the time, due to violent tonic contraction of the chest muscles. The kidneys throughout showed no particular involvement; in fact, all the viscera seemed to act in harmony.

Osteoplastic Closure of Bone Cavities.

Ollier speaks of the great difficulty experienced in the healing of wounds and the filling in of cavities produced by the removal of diseased spongy tissues from bones, especially the long bones and, after studying the divers phases of the question, comes to the following conclusions:

1. Cavities in bones, whether abnormal, accidental, pathological, or following operations, fill up slowly, especially when they are deep, on account of the rigidity of their walls. which do not retract. They cannot be filled by the granulations of medullary origin which form on their walls, at least when the subjects are not young and in a plastic condition. In tuberculous cases the difficuity is always very great.

2. In the long bones, as the tibia, after removal of the medullary substance, the repair is so tedious that it seems almost impossible to heal them. Of the short bones, the calcaneum is especially exposed to this slow repair where it has been reduced to but a thin wall.

3. The method to employ in healing these cavities is to remove or make movable one of the walls to permit, in the first case, the periosteum to reach the opposite wall and, in the second, to place the osseous walls in contact.

4. When one of the bony walls is removed the corresponding periosteum and soft tissues which cover it are pressed into the center of the cavity and come in contact with the opposite wall. The strength of the bone is momentarily decreased by this procedure, but the formation of osseous tissue on the inner surface of the periosteum finally gives the necessary solidity. This is particularly true in cases of hypertrophy of the bone from osteomyelitis.

5. Outside of these cases, where hypertrophy has taken place it is better not to sacrifice the bone, but to form a flap which shall, according to the case, approach or be fixed to the opposite wall by metallic sutures. As soon as the flap has been detached the cicatrization of the wound may be left to the granulations, for while they are without effect upon rigid walls, they act through the cicatricial contraction upon the movable wall. This release of one wall may be effected in many cases at the time the bone is operated upon and the cavity cleared. This precaution prevents the necessity of a secondary intervention.

6. The lateral flap is the easiest and most generally applicable. Many forms of flaps may be required, as cases differ. One may have recourse to flap taken from other parts of the same bone or from neighboring bones, and changed by gliding or by partial torsion of the periosteal pedicle. This flap should always remain connected with the bone from which it was removed by periosteum and the soft parts, and as well nourished as possible to lessen the chances of necrosis of the flap. Where the bone is superficial the flap should be, as far as possible, osteocutaneous.

7. Bone grafts, homoplastic and heteroplastic, may be employed, but only exceptionally, where the means to repair the loss of bone substance cannot be found in the bone itself or any of the adjacent bones.

8. In certain cases where the cavities are intra-osseous, with very thin walls in an atonic condition, it is best to proceed immediately to a resection of their entire thickness or to the total ablation of the bone, if it is a bone which is of but secondary importance to the solidity of the part.—Boston M. and S. Jour.

The Disinfection of Hands.

This subject, which is of such great importance in clinical surgery, has been carefully studied by Weir, whose studies lead him to the following conclusions:

(1) That the solutions of corrosive sublimate are unreliable.

(2) That such disinfection is far best applied, and in the order named, by the use of nascent chlorine, alcohol, or potassium permanganate.

(3) The chlorine is satisfactorily evolved by the conjoined use of moistened chemically pure chlorinated lime and crystallized sodium carbonate.

(4) That of these three procedures the chlorine treatment is least hurtful to the hands, alcohol the most trying.

The author has devised a simple, easy and inexpensive yet efficient method of obtaining the sterilization by nascent chlorine.

After the usual scrubbing with soap and water, and the use of green soap, and clean-

ing the periungual spaces, one or more large crystals of carbonate of sodium (washing soda) are taken in one hand and covered with about a teaspoonful of bleaching powder (chlorinated lime), and enough water is added to make a thin paste, which at first feels warm, and from which fresh chlorine gas comes. This is rubbed for two or three minutes over the hands, nails and forearms until a creamy paste is formed or until the sodic crystals impart a cool sensation or until the rough grains of bleaching power have mostly disappeared, when the hands are washed in sterile water. —Bost. Med. and Surg. Journal.

A Case of Severe Electrical Burns.

The following account of a case, by Dr. J. F. Weathers of New Albany, Indiana, has been sent to us: An electrician employed in the electric plant used to furnish power to the city street car line and to the arc and incandescent lights for the city accidentally brought his back in contact with the positive and negative keys of the switchboard of arc line furnishing ninety-six street lamps and carrying four thousand volts of electricity. He became impaled, so to speak, on those keys until he was released by the tissues being burned away in two pits about three inches in diameter and down to the bony structures. The intervening space between these pits, which were ten inches apart, was roasted, and after the lapse of a few weeks was lifted out. It weighed two pounds and a half. I was called to see him immediately after the accident, which was on April 12, 1897. I applied linseed oil and lime-water, equal parts, pouring the charred cavities full and covering them over with absorbent cotton. I kept this up some days. I administered opiates to relieve pain, which was quite severe. The sloughing was something awful; the cotton, bandages, clothing, and bed were saturated in pus. I turned my attention to some dry dressing, and first used boric acid and bismuth subnitrate, but this produced too much pain. I then tried the antiseptic known as vitogen, sprinkling the powder lightly all over the surface, and over all a cloth saturated with linseed oil was laid. The effect was marked; quietude and sleep followed without the administration of an opiate. This dressing was repeated generally twice a day for many days, and one remarkable feature is that I saw no more pus, and on undressing the wound there was visible no vitogen powder. This treatment was never departed from until September 1, when the patient was discharged. I used eighteen ounces. This man withstood four thousand bolts, as all the arc lamps were extinguished for the time.—(N. Y. Med. Jour., April 2, 1898.)

Osteoplastic Splitting of Bones.

Cramer states that Bardenheuer has further developed the method reported by him in 1894 of a partial section in the long axis of various bones for the obliteration of defects. In his new method the bones of the metatarsus were split lengthwise to fill up the gap in an adjoining metatarsal. A good result was obtained in five cases. The method was extended still further on the metacarpus. In four cases a metacarpal bone having been split lengthwise, one-half was bent over, overcoming the deformity resulting from the extirpation of a neighboring metacarpus. In these cases also the results were very satisfactory. Section of the bone is easily performed with a fine sharp chisel, the bone being left intact at

one of the joint surfaces. The displaced half is made somewhat thicker than the remaining one. Necrosis of the dislocated bony fragment was never observed.

In the case of deformity following the loss of the second metatarsal and of the proximal two-thirds of the first metatarsal, the third metatarsal bone with the adjoining external cuneiform was bodily separated as far as the region of the metatarso-phalangeal joint, at which point the metatarsal remained attached to the neighboring soft parts. Both bones were then dislocated, bringing the external cuneiform in front of the middle cuneiform.

The remaining stump of the first metatarsal was refreshed, and fastened to the dislocated third metatarsal. Again the result was perfectly satisfactory. The principle was further developed in cases where the proximal phalanx, together with its metatarsal or metacarpal bone was wanting, by splitting the corresponding adjoining bones and bodily transposing them. The process was similiarly employed in defects of the radius.—Bost. M. and S. Jour.

The Treatment of Fracture of the Clavicle by Incision and Suture.

Spencer, in an article on this subject, gives an account of an operation performed by Dr. Hearn (Dr. Spencer assisting) at a clinic in the Jefferson Medical College Hospital in the summer of 1896. An incision, three inches in length, was carried directly to the bone and in the direction of its long axis. By exposing the part our attention was first directed to a piece of thin bone, which had been broken off from the posterior inferior surface of the inner fragment and was free in the wound. It was shaped like a righ-angled triangle; the hypothenuse measured one-half inch; the base and perpendicular each measured about three-eighths of an inch; in thickness it measured one-eighth of an inch. This piece was removed. Another fragment of the bone, which was a little larger than the one just spoken of, was found to be separated from the posterior superior surface of the outer fragment, though attached to it by the periosteum. This piece was replaced and held in position by throwing a ligature of kangaroo-tendon around the outer fragment, including the detached piece of bone, and tying. In this case, the subclavious muscle was found to be well up between the fragments. The inner end of the outer fragment was long, ragged and very oblique, and was caught in the few remaining fibers of the subclavious muscle, which fortunately kept the sharp end of the bone from coming in contact with the subclavian and axillary vessels. Fresh lacerations of these fibers of the subclavius muscle, which fortuworking its way through, and in a short time either direct puncture, pressure or ulceration of one of the vesesls would have ensued, This fragment was brought up and the ragged point cut away, after which both fragments were brought together and the periosteum was sutured with fine catgut. The skin-wound was closed with Halsted's subcuticular suture and the arm was dressed in the Velpeau position, with a light plaster-of-Paris dressing. His highest temperature was 99° F., which was on the night of the operation. It dropped to normal the next day and remained normal. In three weeks there was good bony union; no pain or deformity.—Bost. Med. and Surg. Journal.

Major Amputations at the Massachusetts General Hospital.

A Study of the Mortality from 1822 to 1896.

By Charles L. Scudder, M. D.

The major amputations done at the Massachusetts General Hospital from 1822 to 1870 were compiled by Dr. James R. Chadwick in elaborate and carefully prepared tables and were published in May, 1871.

It was found that during the first period, the pre-antiseptic period, 699 amputations of the limbs had been done. The mortality percentage for this period has been recorded in the table following:

Mortality Percentages for the First Period, 1822-1870.

1. Amputation at the Shoulder-Joint.	
Traumatic, primary	53.33
Pathological	27.27
2. Amputation of the Arm.	
Traumatic, primary	19.44
Traumatic, secondary	.....
Pathological	12.50
3. Amputation of the Forearm.	
Traumatic, primary	24.13
Traumatic, secondary	.....
Pathological	14.81
4. Amputation of the Thigh.	
Traumatic, primary	42.37
Traumatic, secondary	60.00
Pathological	20.98
5. Amputation at the Knee-Joint.	
Traumatic, primary	60.00
Traumatic, secondary	.....
Pathological	36.36
6. Amputation of the Leg.	
Traumatic, primary	34.37
Traumatic, secondary	36.41
Pathological	12.60

At the Massachusetts General Hospital, between the years 1870 and 1890, the second period, for a space of twenty years 657 major amputations have been performed.

Through imperfections in the records two cases are not complete enough to include in this report.

The anatomical groups of cases are subdivided into those cases operated upon for dis-

ease and for traumatism, that is, pathological and traumatic groups, and this last group is further divided into primary and secondary classes, according as the amputation was done within or after the twenty-four hours immediately following the accident.

After a careful analysis of these groups of cases, I have determined the average mortality in each, and the causes of death in so far as the records would allow.

There was one amputation at the hip-joint during this period, with recovery. There has been one amputation at the elbow-joint, which died. There have been four amputations at the ankle-joint and four amputations at the wrist-joint, with no mortality. There have been 38 cases of partial amputation of the foot. There have been 77 amputations of fingers and toes.

These cases mentioned above are not included in the estimates of mortality of the major amputations given below.

AMPUTATIONS AT THE SHOULDER-JOINT.

Traumatic, Primary.—Recovered, 7 cases; died, 7; total 14. Mortality, 50 per cent. Causes of death: from shock, 6 cases; internal hemorrhage, 1. The accidents necessitating these amputations were crushes, which in almost every instance caused extensive injury to the parts adjacent to the shoulder and arm; hence the great shock, which caused death.

Pathological.—Recovered, 3 cases; died, 0; total, 3.

AMPUTATIONS OF THE UPPER ARM.

Traumatic, Primary.—Recovered, 36 cases; died, 5; total, 41. Mortality, 12.19 per cent. Cause of death: from shock, 4 cases; hemorrhage, 1.

Pathological.—Recovered, 26 cases; died, 5; total, 31. Mortality, 16.12 per cent. Causes of death: from shock, 3 cases; record incomplete, 2.

AMPUTATIONS OF THE FOREARM.

Traumatic, Primary.—Recovered, 37 cases; died, 11; total, 48. Mortality, 22.99 per cent. Causes of death: from shock, 5 cases; secondary hemorrhage, 2; ether, 1 (the autopsy showed no lesion to account for death); sepsis, 2; fracture of base of the skull, 1.

Pathological.—Recovered, 22 cases; died, 3; total, 25. Mortality, 14 per cent. Causes of death: tetanus, 2 cases; uremia, 1.

AMPUTATIONS OF THE LEG.

Traumatic, Primary.—Recovered, 86 cases; died, 33; total, 119. Mortality, 27.73 per cent. Causes of death: from delirium tremens. 1 case; secondary hemorrhage, 1 case in 1877; fat embolus, 1; internal injuries, 1; carbolic acid poisoning, 1; shock, 17; sepsis, 11 (two of these cases became septic from gangrene of the parts). Eighty-eight of these cases were railroad accidents, and of these 88 cases, 23 died.

Traumatic, Secondary.—Recovered, 22 cases; died, 6; total, 28. Mortality, 21.43 per cent. Causes of death: from sepsis, 4 cases; shock, 2.

Pathological.—Recovered, 100 cases; died, 16; total, 116. Mortality, 13.78 per cent. Six of these deaths occurred previous to 1879, and were due to sepsis. Seven of these deaths occurred in elderly people, the amputation being done in five cases for senile gangrene, in two cases for traumatic gangrene. One death was due to general tuberculosis; one death was due to exhaustion, four days after the operation; one death was due to pneumonia.

AMPUTATIONS AT THE KNEE-JOINT.

Pathological.—Recovered, 6 cases; died, 6; total, 12. Mortality, 50 per cent. Two deaths were from sepsis, prior to 1873. One death in 1879 was due to carbolic acid poisoning. One death was due to tetanus, 1871. One death, the patient did not recover from ether, 1879. One death from secondary hemorrhage, 1872.

Traumatic, Primary.—Recovered, 4 cases; died, 6; total, 10. Mortality, 60 per cent. Causes of death: from sepsis, 2 cases; carbolic acid poisoning, 1 case in 1879; tetanus, 1; ether, 1; secondary hemorrhage, 1.

Traumatic, Secondary.—Recovered, 10 cases; died, 12; total, 22. Mortality, 54.54 per cent.

AMPUTATIONS OF THE THIGH.

Traumatic, Primary.—Recovered, 32 cases; died, 29; total, 61. Mortality, 47.54 per cent. Forty-six of these cases were railroad accidents, of which 21 died and 25 recovered. Of the 29 deaths, 24 cases died of shock, 4 of sepsis, 1 of pneumonia.

Traumatic, Secondary.—Recovered, 5 cases; died, 2; total, 7. Mortality, 28.5 per cent. The injuries necessitating amputation of the thigh were so severe as to cause often multiple lesions. The combination of all these lesions caused great shock, producing death in many cases.

Pathological.—Recovered, 56 cases; died, 17; total, 73. Mortality, 23.28 per cent. Eight deaths due to sepsis; 6 to shock; 2 to carbolic acid poisoning; 1 to secondary hemorrhage.

MORTALITY PERCENTAGES FOR THE SECOND PERIOD, 1870-1890.

1. Amputation at the Shoulder-Joint.
   - Traumatic, primary ..... 50.
   - Pathological ..... 0.
2. Amputation of the Arm.
   - Traumatic, primary 12.19
   - Traumatic, secondary ....
   - Pathological 16.12
3. Amputation of the Forearm.
   - Traumatic, primary 22.99
   - Traumatic, secondary ....
   - Pathological 14.00

4. Amputation of the Thigh.
   Traumatic, primary..... ..... 47.54
   Traumatic, secondary 28.05
   Pathological 23.28
5. Amputation at the Knee-Joint.
   Traumatic, primary.... ..... 60.00
   Traumatic, secondary ....
   Pathological 50.00
6. Amputation of the Leg.
   Traumatic, primary..... ..... 27.73
   Traumatic, secondary.... ..... 21.43
   Pathological 13.78

During the years from January, 1885, to December, 1896, the third period, there have been performed 670 amputations.

AMPUTATIONS AT THE SHOULDER-JOINT.

Traumatic, Primary.—Recovered, 13 cases; died, 6; total, 19. Mortality, 31.57 per cent. These cases all died from shock a few hours after amputation.

Traumatic, Secondary.—One case which died of shock.

Pathological.—Recovered, 2 cases; died, none. One of these cases was a sarcoma of the forearm and one case sarcoma of the humerus.

AMPUTATIONS OF THE UPPER ARM.

Traumatic, Primary.—Recovered, 42 cases; died, 12; total, 54. Mortality, 22.22 per cent.

Traumatic, Secondary. — Recovered, 9 cases; died, 2; total, 11. Mortality, 18.18 per cent.

Pathological.—Recovered, 16 cases; died, 2; total, 18. Mortality, 11.11 per cent. The cause of death in one case was sepsis. The diseases for which amputation was done were: Sarcoma, 6 cases; tuberculosis, 2; painful stump, 3 (one died); epithelioma, 2 (one died); paralysis, 2; gangrene, 3; total of 18 cases, 2 deaths.

AMPUTATIONS OF THE FOREARM.

Traumatic, Primary.—Recovered, 47 cases; died, 3; total, 50. Mortality, 6 per cent. The deaths were due to shock.

Traumatic, Secondary.—Recovered, 4 cases; total, 4.

Pathological.—Recovered, 32 cases; died, 3; total, 35. Mortality, 8.57 per cent. The diseases for which amputation was done were: sarcoma, 2 cases; carcinoma, 8 (1 died from exhaustion); tuberculosis, 14 (1 died from exhaustion); painful stump, 4; septic hand, 3; gangrene (traumatic and diabetic), 3; tetanus, 1 (died); total, 35; 3 deaths.

AMPUTATIONS OF THE LEG.

Traumatic, Primary. — Recovered, 158 cases; died, 25; total, 183. Mortality, 13.66 per cent.

Traumatic, Secondary.— Recovered, 13 cases; died, 1; total, 14. Mortality, 7.14 per cent.

Pathological.—Recovered, 102 cases; died, 16; total, 118. Mortality, 13.55 per cent. Diseases for which amputation was done and the cases died: compound fracture of the leg, 1 case; carcinoma of leg, 1; gangrene (traumatic 5, diabetic 4, senile 5), 14; total deaths, 16 cases.

AMPUTATIONS AT THE KNEE-JOINT.

Traumatic, Primary.—Recovered, 1 case; died, 1; total 2. Mortality, 50 per cent.

Pathological.—Recovered, 3 cases. Diseases: elephantiasis, carcinoma, traumatic gangrene, one case each.

AMPUTATIONS OF THE THIGH.

Traumatic, Primary.—Recovered, 46 cases; died, 25; total, 71. Mortality, 35.21 per cent.

Traumatic, Secondary. — Recovered, 5 cases; died, 3; total, 8. Mortality, 37 per cent.

Pathological.—Recovered, 63 cases; died, 8; total, 71. Mortality, 17.55 per cent.

Diseases for which amputation was done: elephantiasis, painful stump, enchondroma, ununited fracture, cicatricial contraction, ulcer of the leg, carcinoma of leg, gangrene, diseases of hip, osteomyelitis, sarcoma of tibia, sarcoma of femur, tubercular knee.

AMPUTATIONS AT THE HIP-JOINT.

Tuberculosis, 2 cases (1 recovered, 1 died); myxoma, 1; osteomalacia, 1; traumatic, primary, 2 (died). Total hip amputation, 6 (3 recovered, 3 died).

SUMMARY OF THIRD PERIOD.

	Cases.
Shoulder-joint	22
Upper arm	83
Forearm	89
Leg	315
Knee-joint	5
Thigh	150
Hip	6
Grand total	670

MORTALITY PERCENTAGES FOR THE THIRD PERIOD, 1885-1896.

1. Amputation of the Shoulder-Joint.
   Traumatic, primary 31.57
   Pathological ....
2. Amputation of the Arm.
   Traumatic, primary 22.22
   Traumatic, secondary 18.18
   Pathological 11.11
3. Amputation of the Forearm.
   Traumatic, primary..... ..... 6.00
   Traumatic, secondary.... ..... 0.00
   Pathological 8.57
4. Amputation of the Thigh.
   Traumatic, primary..... ..... 35.21
   Traumatic, secondary..... ..... 37.00
   Pathological 17.55
5. Amputation at the Knee-Joint.
   Traumatic, primary..... ..... 50.00
   Pathological 0.00
6. Amputation of the Leg.
   Traumatic, primary 13.66
   Traumatic, secondary 7.14
   Pathological 13.55

(1) The period from the founding of the hospital to 1870, represents the amputations done before antiseptics were generally used.

(2) The period from 1870 to 1890 represents

the operations done while antiseptics were being introduced and had become established.

(3) The period from 1885 to 1896 represents the true antiseptic and aseptic period. The total amputations from the opening of the hospital cannot be estimated, for periods 2 and 3 overlap.

A glance at the following table, comparing the first and third periods, is very instructive. For some reason traumatic primary amputations of the arm present a higher mortality in the later period than in the first period. This is true of pathological amputations of the leg.

TABLE COMPARING MORTALITY PERCENTAGES OF MAJOR AMPUTATIONS DONE AT THE MASSACHUSETTS GENERAL HOSPITAL.

	1821-70.	1870-90.	1885-96.
1. Amputation at the Shoulder-Joint.			
Traumatic, primary	53.33	50.00	31.57
Pathological	27.27	00.00	00.00
2. Amputation of the Arm.			
Traumatic, primary	19.44	12.19	22.22
Traumatic, secondary			18.18
Pathological	12.50	16.12	11.11
3. Amputation of the Forearm.			
Traumatic, primary	24.13	22.99	6.00
Traumatic, secondary			0.00
Pathological	14.81	14.00	8.57
4. Amputation of the Thigh.			
Traumatic, primary	42.37	47.54	35.21
Traumatic, secondary	60.00	28.50	37.00
Pathological	20.98	23.28	17.55
5. Amputation at the Knee-Joint.			
Traumatic, primary	60.00	60.00	50.00
Pathological	36.36	50.00	00.00
6. Amputation of the Leg.			
Traumatic, primary	34.37	27.73	13.66
Traumatic, secondary	36.41	21.43	7.14
Pathological	12 60	13.78	13.55

All other amputations show a noticeable diminution in the mortality percentage.

The factors contributing to the diminution in the mortality rate are probably several: the strict adherence to antiseptic and aseptic surgical principles in operating; perfection in the technique of operating; an intelligent care of the patient from the time of the receipt of the injury; the absence of primary hemorrhage; the greater care in the first dressing exercised by the general practitioner who sees and sends many of these cases to the hospital. All these factors play an important causative part when considered collectively in diminishing the mortality following major amputation.—Bost. M. and S. Jour.

Direct Compression of the Common Iliac Artery During Amputation at the Hip-Joint.

McBurney, in an article on this subject, states that loss of blood during the performance of amputation at the hip-joint is of especial importance, because almost all of the cases in whom this operation is indicated belong to one or two classes: (1) Those suffering from extensive, often long-continued, disease, and who are therefore feeble and anemic; (2) traumatic cases, weakened by the shock of the traumatism, and usually anemic from considerable blood loss. Therefore, in amputation at the hip-joint every precaution should be taken again hæmorrhage and against sepsis.

He states that in the last three of his cases he has adopted a method which is simple and effectual, and all three patients have recovered.

First, as much blood as could be safely returned to the body from the limb to be amputated, by means of position or elastic bandage, was so returned. Then an incision was made through the abdominal wall about one and a half inches internal to the anterior spine of the ilium.

In the last two cases this incision was made by separating the aponeurotic and muscular fibers according to the plan suggested by the author in operating for removal of the appendix in the interval between attacks. This, of course, eliminates the possibility of subsequent hernia. Through this incision an assistant passed his index finger and readily reached and compressed the common iliac artery.

Entire absence of blood-current beyond the point of compression was readily maintained throughout the amputation which followed. The operative field was entirely free from bandage or appliance of any kind, the opportunity to maintain complete asepsis was therefore free from complication, and the amputation was made without other loss of blood than that which took place from the vessels of the limb below the point of amputation. The author deems the method commendable on account of its simplicity, its certainty, its aseptic character, and because it can be applied to cases which require that the deeper tissues should be severed at an unusually high level, —Bost. M. and S. Jour.

The Operative Treatment of Irreducible Subcutaneous Fractures.

Ransohoff, in an article on this subject, believes that in certain cases an interference before union had resulted would be preferable to the certainty of deformity, and reports seven cases which have come under his observation in which the fracture was exposed and directly treated.

The author states that his experience or what he has gleaned from literature does not warrant him in coming to conclusions that are final. Nevertheless, he believes that it would be justifiable to submit in a tentative way the following postulates:

1. The conversion of a simple fracture is justifiable when other means to secure the best end results fail.

2. In fractures of the diaphysis of the tibia, femur, humerus and clavicle in which insur-

mountable longitudinal dispiacement or axial rotation has taken place, immediate operation or mediate operation before definite union has occurred is indicated.

3. In epiphyseal separations, when reduction cannot be otherwise effected, an early operation is justified.

4. Fractures complicated with dislocations irreducible by other methods warrant operative interference.

5. The involvement of a joint, except probably in the case of knee and hip, do not, per se, militate against operation if this is otherwise indicated.

6. If extensive comminution is present, as in compression or crushed fracture, operation is contraindicated.

7. Special precautions against infection must be taken, in connection with which should be borne in mind the dangers of too firmly closing a wound and the advantage of temporary tamponade and secondary suture.

8. Reckless and indiscriminate resort to the operative relief of deformity in recent simple fractures is to be condemned, since there would be few fields of surgery, in the event of an unsuccessful intervention, in which the contrast could be greater between the good intended and the harm done.—Bost. M. and S. Jour.

A New Instrument for Trephining.

Dahlgren describes an ingenious instrument which he has devised, which has the essentials of simplicity and efficiency combined. After a small trephine opening has been made and the dura mater pushed inward with a probe, it cuts a linear channel through the skull in any direction the operator may desire. It is especially adapted to the formation of the skin-periosteum flap-bone employed in Wagner's method of cranial resection.

The instrument consists of a bone forceps whose jaws do not cross, but separate beyond the point of articulation. One arm carries a sharp hook which articulates at the extremity of the jaw and passes through between the two cutting prongs of the other jaw. The bone is grasped and cut through by the hook while pressed against the outer surface of the jaw. By means of a set screw the instrument can be accurately adjusted to the thickness of the bone to be cut through.—Bost. Med. and Surg. Journal.

A Cheap and Serviceable Surgical Suture.

Gubaroff described a new method for preparing ordinary linen thread for surgical use in such a manner that it does not kink, twist or knot, and is readily rendered aseptic.

The thread is deprived of its fat by boiling in caustic soda, then washed in water and sterilized, and laid for a few days in alcohol. It is then placed in a five per cent celloidin solution (Schering), with equal parts of alcohol and ether; from this solution it is laid out and allowed to dry while stretched. The threads contract and are shining, do not absorb or twist, and may be readily threaded The sutures may be sterilized, but cannot be kept in alcohol, though they may be placed in bichloride or carbolic solutions. Sublimate (1 to 1,000) may be added to the celloidin solution, making it antiseptic.—Bost. M. and S. Jour.

Spontaneous Combustion of Hydrogen Peroxide.

Mr. Charles H. La Wall records an instance of the spontaneous combustion of peroxide of hydrogen used as an application on cheesecloth to a wrist affected by poison oak. The moistening of the cheesecloth being discontinued, several hours later an odor of burning clothes and severe pain in the wrist directed the patient's attention to the fact that the bandage was smoldering and was already charred black in many places. Before it could be removed it had caused several burns on the wrist, which required weeks to heal and which will show scars for several years.

A subsequent experiment with peroxide of hydrogen and cheesecloth produced the same result, which is attributed by the author as possibly due to a small amount of free sulphuric acid.—(American Journal of Pharmacy.)

Zinc Glue for Surgical Dressings.

The following is advised as a means of obtaining stiff surgical dressings for application to fractured or dislocated limbs:

℞ Zinc oxide	10	parts;
Gelatin	30	"
Glycerin	30	"
Water	30	"

This is thickly applied and rubbed into the muslin or gauze forming the bandage. A thicker preparation contains twenty parts of gelatin and forty parts of water, the other ingredients remaining the same.—(Prescription.)

A dislocation should be reduced as soon as possible, while a fracture may often be allowed to wait for a convenient time and place. the emergency dressing simply guarding against such accidents as perforation of the skin by subcutaneous fragments of bone, dangerous pressure upon important structures, or threatened laceration of nerves or vessels.—Georg. J. Med. and Surg.

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THE MEDICO-LEGAL SIGNIFICANCE OF THE PHYSICAL AND MENTAL EXAMINATIONS OF RAILWAY EMPLOYES.*

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Common carriers of persons and property are held by common and statute law "to use the utmost care and skill which prudent men use under the same circumstances; are liable for the slightest neglect'; but they are not insurers."[1] They are not liable "for injury resulting from accidents against which the highest degree of skill, foresight and diligence would have been unavailing."[2] * * * "but the highest degree of practicable care and diligence under the circumstances."[4]

Such is the language of a distinguished advocate and may be accepted as one of the first principles of the law under which individuals and corporations are privileged to become carriers of persons and property. Strict compliance with these provisions requires a very high degree of care and diligence on the part of the management, and servants of such corporations. Being amenable to the law, it becomes necessary to act upon the defensive and surround their corporate power with every safeguard against possible structural weakness of material, faults in design, or the neglect or incompetency of servants. At the same time the servants of individual and corporate carriers have rights which the management is bound to respect.

The courts all over the country are constantly beseiged by those who are or have been employed as servants of corporations, the allegation being that they have been injured, through the want of skill in management, defects in design or reasonable care in the use of machinery, in short, the claim is made that due diligence and care has not been exercised in watching over the interest of the great army of employes. The grounds assigned for cause of action against railway corporations are so numerous that the plaintiff's lawyer seems to have no difficulty in satisfying his client that he has a good case, it being considered only fair that a jury will look with favor on the individual, rather than the corporation, and yet the corporation, or master, in the exercise of due care and diligence in the selection and education of its servants, is relieved of much of its responsibility to the public, that might with less care become an important factor in determining its liability. I have used the term education of its servants, because until servants are instructed in the duties they are expected to perform, the master is liable for their errors or incompetency.

In support of this position I have heard the following quotations from common law laid down in court as being of importance in actions of tort.

1st. "An employer must use due care in the selection and hiring of his servants, and if he fails in this particular and negligently or carelessly employes one who is incompetent, he is liable; he is liable for injury sustained by a co-servant on account of such incompetency."[5]

Therefore inefficiency of a servant becomes a cause of action if his incompetency is the cause of an injury.

2d. "There must be due and reasonable care and diligence proportionable to the hazard of the business."[6]

In other words, extra hazardous labor requires extra diligence and care in the selection of its employes, as well as the necessity of

* Read at the eleventh annual meeting I. A. R. S. at Toronto July 6, 7, 8, 1898.

1. Hall v. Steamboat Co. 13 Conn. 319 and others
2. Thompson Carrier of Passengers, 197.
3. Pacific R. R. Co. v Miller, 2 Colo. 442
4. Tuller v. Talbot, 23 Ill. 357
5. Blake v. Maine Central R. R. Co., 70 Me. 60. Page 205 and others.
6. Ala. & F. R. R. Co v Waller, 48 Ala. 459.

the servant being instructed and informed of the hazardous nature of the work.

3d. "If he makes a careful inquiry into the habits and competency of the men employed, and upon such inquiry believes and has reason to believe them sober, competent and careful, this is certainly sufficient."[7]

Naturally the question arises, can a careful inquiry be made except by conducting a mental and physical examination, sufficiently rigid to reveal the existence of a mental or physical defect?

In the New Hampshire Law Reports of 1894 Judge Blodgett used the following language in a recent decision:

4th. "The rule that the burden of proof is on the plaintiff to prove the exercise of proper care is, however, easily satisfied, and the exercise of such care may be shown by circumstantial as well as by direct proof. It may even, under certain circumstances, be inferred from the ordinary habits and disposition of a prudent man, and the instinct of self-preservation."

There can be no doubt but self-preservation is one of the strongest attributes of a well-balanced mind, and the same may be true of those less endowed with mental vigor. Yet, in an ordinary emergency, their mental weakness causes them to do strange things, or more often to be incapable of doing anything which the necessities of the case demand.

5th. "Where an employer is not guilty of negligence in hiring an incompetent or unfit employe, but subsequently becomes aware of his incompetency, or might have known of it by the exercise of reasonable and proper care, and continues such employe in his employment, he is liable to a co-servant sustaining injury through his unfitness."[8]

This shows that employes occupying responsible positions such as require the organs of vision and hearing to be acute, their habits and mental faculties to be without fault or blemish, must from time to time be examined by those competent to determine their fitness to perform their service, without danger to themselves, their fellow servants or the public.

After listening to rulings such as the above, it seems as if the management of every corporation having occasion to employ servants should be cognizant either personally or through its departmental organizations, of the mental and physical capacity of each and every person employed. The larger the army of employes, the more complex and difficult the problem becomes.

As an association of surgeons it may be pertinent to inquire whether we are interested in the question of the management of railroads instituting a mental and physical examination of its employes. In the abstract we are not, and this is especially true of those residing along the lines of such roads as have no form of medical and surgical organization. Such surgeons are called upon by the railroad to render their services in very much the same manner as a fire department is summoned, because their services are a necessity, and surgeons in towns along the line of such roads have more or less service according to competency or the incompetency of the employes, as it is a well-known fact that accidents occur more frequently where servants are incompetent and unskilled. On roads having some form of a surgical organization, it should be the ambition of that department to be, not only effective in its surgery, but like the passenger, freight, motive, road and legal department, it should endeavor in every honorable way to increase the efficiency of the employes, elevate the standard of the road's popularity, and last, but not least, increase the net revenue of the corporation by lessening the expenses of accidents and personal injuries.

I am well aware that the management of some roads are considering the possible solution of this problem, and I presume some members of this association have been, and others will be, called upon for an opinion on the subject.

At the last annual meeting of this association, Henry F. Hoyt, M. D., of St. Paul, Minn., chief surgeon of the Great Northern Railroad, in bringing this subject before the association, made this remark:

"With very few exceptions a man cannot enter into any department of civil, military or naval service of this government without first demonstrating that he is physically sound and free from disease, or its effects, and un-

7. Moss. v. Pacific R. R., 49 Mo. 167.
8. Alabama, etc. R. R. Co. v. Waller, 48 Ala. 459.

less he can do so he is promptly rejected, no matter what his mental attainments may be. Yet how slight is their physical responsibility as a rule, compared with that of the average trainman on a railway—who can get employment with hardly a thought of his physical condition, be at once put in charge of human lives and property, where in discharge of his duty a pathological or congenital defect may cause great loss of both."

"It is a well-known fact that in the examination of over a million recruits during the war of the Rebellion, 3.7 in every thousand were rejected on account of spinal deformities; 14.9 on account of heart disease; 15.5 on account of defects in vision, and 3.2 on account of trouble or disease of the ear. It is interesting to note that the combined number rejected in every thousand examined on account of heart and spinal trouble was 18.6 and that of the eye and ear 18.7. I believe no country in the world accepts new recruits for its army or navy without a rigid physical examination, and all having physical defects, latent or incipient disease, are rejected, but a complete record of their physical or mental defects is kept for future use."

The employes of the railroads of this country number nearly or quite one million, nearly or quite one-half being train men, and we may safely assume the physical defects to be found in this army of workmen will equal if not exceed those to be found among those seeking service in the United States army. I think it quite probable that it would exceed rather than fall short, as it is a well-known fact that a physical examination must precede being accepted into the United States service, therefore, those believing they have physical defects do not, as a rule, make an effort to enlist. On the other hand, it being understood that no examination is required to enter the railroad service, there is nothing to deter anyone from applying for a situation.

At the present time, the only corporations having any form of an examination are those who require their employes to become members of their respective relief associations and these relief funds are practically controlled and conducted by the employe rather than the management.

In this connection let me add, I believe the employe has an interest in having a rigid physical and mental examination of his fellow employes, for anything that elevates the standard of efficiency of the service, renders him less liable to injury, accidents to rolling stock will be less frequent, ordinary expenses will be reduced, and whenever the net revenue is increased, there is a greater possibility of an increase in wages. Therefore, good and true employes have every reason to maintain a high standard of efficiency in train service.

A few weeks since, Dr. J. H. Ford, surgeon of the C. C. C. & St. L. R. R., in a paper before the Central Association of Railroad Officers, said: "It is a right the traveling public has to demand that the human machine employed shall be as perfect as any other part of the equipment; should pass a rigid inspection. It is the duty of the management to the owners to protect their property, and they should be as accountable for loss through the personal equation if they allowed an imperfect employe to go over the road as if they allowed a defective engine or car."

In commenting upon these papers, that most excellent journal, the Railway Age, remarks:

"Dr. Hoyt and Dr. Ford are two excellent authorities in their profession, and what they say should have weight with railway managers. But their arguments do not rest on professional knowledge alone; they appeal to the common sense of all men."

From a Boston paper of April 12, 1898, I made note of the following item:

"The Big Four has decided to subject all applicants for position in the running of its trains to a severe physical examination. Blanks are being prepared to show qualifications required."

I believe this is the road of which Dr. Ford is surgeon, and I hope this innovation is a truth, and that it will prove to be a success.

About four years since the writer had the honor to read a paper before the Medico-Legal Society of New York, in which he took the position:

First. That a rigid physical and mental examination should be instituted before allowing new recruits to enter the service of railroads.

Second. All roads should have a school of

instruction in which new recruits should be thoroughly drilled in the work which they are to perform, so as to bring out the best results of all safety appliances and also those intended to supply the heating, lighting, ventilating and cleaning of cars. The intention of this being to simply enlarge the school of instruction in the use of automatic brakes that is now practiced on most large roads, and which might, without much additional expense, be made a part of the standard of education.

Third. That the recruit, after being thoroughly instructed in every duty that can in any way serve to render the lives and property of all concerned more nearly safe and comfortable, and having passed an examination, he should be advised of the fact that in taking service upon a railroad he is entering upon a vocation extra hazardous in its nature, but, having been thoroughly instructed in his work and given an opportunity to learn its duties, he must take a certain amount of chance of his life and limb without recourse or damages.

It may be argued that new trainmen are always informed by someone connected with the train that they must be constantly on the lookout for danger, but is such general notice sufficient? I have heard the following quotation from a text-book read in court, to show that the plaintiff was entitled to something more than a general information of danger. The author says:

"I do not understand that the obligation of the defendant would be discharged by informing the servant generally that the service engaged in is dangerous; especially where the servant is a person, who, neither by experience nor education, has, or would be likely to have, any knowledge of the perils of the business, either latent or patent; but that in such case, the servant should be informed, not only that the service is dangerous, and of the perils of a particular place, but where extraordinary risks are or may be encountered, if known to the master, or should be known by him, the servants should be warned of these, their character and extent so far as possible. It seems to me the value of human life and the duty of the master in affording reasonable protection to persons, while under his direction, cannot be held to require less than this."[9]

It is evident from this that not only is a certain amount of skill required to perform a given labor, but it must be reasonably certain that the servant has the requisite intelligence to exercise judgment and care in its performance. I have heard it remarked that something like a civil-service examination would be a good thing for the road, as it would serve to elevate the standard of intelligence of the employes—but that it would involve expense to carry it out, and that with a higher standard, the men would want more pay. Undoubtedly there is some truth in this statement, but on all roads having a surgical department it would be possible for the trainmaster, the master mechanic and chief surgeon to constitute an examining board, without more additional expense than would be saved in accidents, personal injuries and loss by want of care in moving trains.

A physical examination of a recruit to occupy the position of train man, should be as thorough as it would be to enter the United States army. This is necessary in order that it should be reasonably sure that he is not idiotic, an epileptic, a victim of intemperance or kleptomania, nor that he is predisposed to be ungentlemanly and discourteous in his behavior toward others. Color blindness, astigmatism, deafness, partial paralysis, mutilation or ankylosis of fingers, rheumatic enlargement of the joints, pleuritic adhesions, hernia, chronic diarrhea, asthma, and functional or organic disease of the heart should be noted, and any approach to any of these being serious, should serve to disqualify him for any place or position on a train that might in any event compromise his own safety or the lives of the public. Not until he had passed this physical examination should he be admitted to the school of instruction. It would seem to be unnecessary to comment upon anything so plain as that it is desirable to have only those in the service as would pass a physical examination, and I would not intimate that any corporation intended to employ such as would be physically disqualified, yet without examination it is quite impossible

9. Cooley on Tort, 554.

to prevent such men from being employed.

The young man having no physical defect and fairly well educated will hesitate from seeking service of an extra hazardous character, unless his ambition prompts him to believe that it will very soon lead to a position higher than train work. The pay of the ordinary train man is not equal to that of the skilled mechanic, and it is because there is no examination—mental or physical—that so many drift into the ranks. There seems to be a fascination for a certain class of young men to be around and riding on trains. As automatic brakes have been introduced, the hard work of the trainmen has been set aside, until there was some reason for an official making this remark about brakemen: "They have been relieved from year to year of their former duties, until they feel that all they need to do is to wear a uniform." That it is a fad for some people to want employment of an extra hazardous kind, like being trainmen, is only another good reason why a physical examination should be required before they are engaged.

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After having passed the required physical examination, the mental and manual school of train service should commence. He should be drilled in his duties as train man until he is familiar with the operation of the train and hand-brake; in the use of signals, and in the inspection of every part of a car and its trucks. He should also be taught how to make such repairs and use expedients as may be of use in case of accident. The automatic brake has been in constant use for many years, yet it has been found necessary on some roads to fit up a car with all the latest improvements, and with a competent instructor to go from one division point to another, from the men into small classes, and teach them not only the ordinary manipulation of the power brake on trains having a clear track, but the possible extraordinary application of the same appliance when emergencies arise. It is understood that such instruction is considered a good investment in teaching the men many practical ideas that were not familiar to them, because nothing had occurred to bring out the possible power of the automatic machine, under circumstances requiring quick thought and action. A school of instruction like this might easily be so enlarged in its scope as to include the manipulation of coupling and uncoupling of cars, the making up of trains without de-

struction of property, and to show the care one must have for himself and others, also that he is respectful to his co-employes and the public. It is quite possible that defects would show up while the recruit was being drilled in the work he is to perform. This frequently happens to the new recruit in the army, and train work is no exception to the general rule.

In mechanical work, as in other exigencies which the mind is intended to provide for, it is not the expected dangers which cause the most trouble, but it is the unexpected dangers to which we are exposed that cause the greatest damage and loss. Train work is no exception to this rule, and every train man should be educated what to do under all possible circumstances—should be taught to think for themselves what they would do under hypothetical complications, for surely there is no time for instruction when the critical moment comes which requires action.

In the discussion which followed my paper, Albert Bach, Esq., vice-president of the Medico-Legal Society, gave it as his opinion that railway companies would not have to be urged to give their employes the instruction suggested in the paper. He said:

"To my mind, it would be a question of self-protection for them to do so. Not only is it a question of moral obligation to the community, but it would be a question of dollars and cents to the corporation to see to it that they saved themselves from damages in suits brought against them for injuries sustained by reason of lack of proper training of their employes."

In the further discussion of this paper, Judge A. H. Dailey of Brooklyn, ex-President of the Medico-Legal Society, said:

"As a general thing, we do not find among railway corporations that degree of care in the selection of their servants which the necessities actually require. When I see the judgments rolled up against railway corporations through incompetency and mismanagement, I am astonished, not only that they contend against such judgments, but that they will take the chances of subjecting themselves to such vast liabilities. This very suggestion of the author is one of great importance, and I have no doubt it will lead to good results, especially if the lawyers and surgeons unite in their effort to correct these abuses.

"Every employe of a railway is assumed to know the risks and dangers attendant upon his duties; but if the employer puts a man on extra hazardous duty, it is the duty of the employer to instruct the employe as to these dangers, and then the employe assumes the responsibility. As a rule the employe takes the risk of the negligence of his co-employe. The master must see that he has proper co-servants, but after that they all take their chances as to the negligence of their co-servants."

The management of a railroad is no part of the work of the surgeon. This is emphatically true of such surgeons as are only employed when some one gets hurt. Personally, the more that get hurt, the more often are the services of a surgeon required. Every surgeon who has had several years' experience with train and track men, the lumber and bridge gangs, the snow shovelers in the winter and the gravel crew in summer, must have often found those with such mental and physical defects as would cause him to hesitate about employing such a person to do any kind of work requiring care and responsibility. While the surgeon has no part in the management of the railroad, his professional education eminently fits him to discover the mental, moral, and physical defects that might render an employe liable to accidents, and injury to himself or a menace to the lives and limbs of others.

In summarizing this paper, it may be stated:

First. Railways are common carriers, and are, therefore, subject to common and statute law.

Second. The law holds them liable to the public for employing servants that are inefficient because of ignorance of their duties, or incompetent by reason of mental, moral or physical defects.

Third. Co-servants that are injured by reason of the inefficiency or the incompetency of a fellow servant have the same rights in court as the public.

Fourth. Any reform that will elevate the standard of excellency of the service, lessen the expenses for personal injuries and increase the average service of rolling stock and roadbed, at once becomes a factor in increasing the net revenue of the corporation.

Fifth. With our professional knowledge of

the great percentage of mental, moral and physical defects in men that would disqualify them from being accepted as recruits in the service of the United States army or the United States navy, are we not justified in calling the fact to the attention of railway managers?

DISCUSSION.

Dr. H. L. Getz of Marshalltown, Ia.: This is a paper of interest to every railway surgeon, as well as the management of the several railways. I have nothing in particular to add to the paper, which was so exhaustive in its treatment of the subject. I want to say, however, that it is absolutely necessary to make a physical examination. I would give little or nothing for an examination of the sight and hearing if the physical examination is not made thoroughly by divesting the individual of all clothing, the same as we would do in making an examination for military or naval service. This plan is adopted by the railroad which I represent and examinations are conducted as thoroughly as any examinations which I have made for the military service.

You can tell nothing about the make-up of an individual physically outside of the sight and hearing, his temperament, etc., unless you examine him thoroughly. This is very important. It is important to the management of railways to know what defects an individual has in case of injury, that they may know how much can be counted on prior to the receipt of the injury, and it will save cases from going into court. I have known a man with a slight fatty tumor on his back, perhaps the size of the end of my thumb, who never knew it was there prior to the occurrence of an injury; at least he said it was not there. Had he been examined before he sustained an injury and notation made of the condition, it would probably have prevented him from bringing a suit against the company. This is only an illustration, but the instances in which such disabilities may be discovered and afterward used to advantage in the interests of the railway companies are numerous. It is only right from a financial point of view that the managers of railways should see to it that a thorough examination be made of individuals.

I must take exception to one point in the doctor's very able paper with reference to making the requirements quite as rigid for railway service, as far as physical perfection is concerned, as for army service. For instance, a man would not be accepted in the army with his index finger gone unless they were hard pressed. A man, however, may be fairly competent; he may discharge his duties as a trainsman with one finger gone from one hand or with a finger gone from either hand. In our examinations we require that a man shall have both his thumbs. It is important, because to lose a thumb and undertake to do work as a trainsman disqualifies him materially.

I want to call attention to a point referred to by the doctor, namely, that there are no railways which require this physical examination except the ones in which the employes are members of some insurance organization. Is that right, doctor?

Dr. Conn: I believe I said relief associations or insurance.

Dr. Getz (continuing): While the road I represent has no such organization, it has in effect thoroughly and completely everything the doctor has suggested. I also know that the Chicago & Northwestern Railway has in effect a similar or like examination for its employes. I only speak of this because I know it is a fact.

Dr. Wm. S. Hoy of Wellston, Ohio: Dr. Conn in his paper to-day made a point which impressed me very forcibly when he suggested incompetency in railroad management. In the state of Ohio, whence I came, we take our boys and start them at the bottom of the ladder and keep them going up. We educate them, we make experienced trainmen of them, and Ohio is never behind any state in anything she tries to accomplish, and she has adopted a rigid physical examination for all employes of various railroads. We find to-day evidence of incompetency on every hand. We found it a few days ago when our navy came in contact with a navy less competent, and we will find it to-day in the management of railroads.

As a railway surgeon I make it a rule to attend to my business and let the management of the road attend to their business. I take it that as railway surgeons we have got to attend to the surgical department of the roads which we represent. Let the managers of our railroads look more into the type of men in their

employ. A good railway surgeon always looks after the interests of the railway company which pertains to his department, and when an accident occurs he gives his company a true and accurate report of the man's condition and injuries. His report should not be colored to suit either side of the case, but he should make it just as the facts and circumstances warrant, and then let the claims department attend to the settlement of the case.

So far as the examination of railway employes is concerned, heretofore a number of men have been examined and it has been said that these examinations were conducted by men connected with the medical departments of railroads who are incompetent for this work.

I have nothing further to say at this time except to suggest one thought: Let the railway surgeon do his duty as such and let the various railway managers do their part as competently as we do ours, and I am satisfied there will be no complaint made.

Dr. Wm. E. Guthrie of Bloomington, Ill.: I would like to ask Dr. Conn or Dr. Getz what means are used toward the payment of the examiner. Is this examiner a regular contract surgeon of the road or is the examination made by outside parties?

Dr. Conn: As to physical examination of employes, I was led to prepare this paper because the management of the road inquired of me if there was not some way to improve the personnel of the employes, and I said to them I believed such an examination was necessary, not only when they entered the service, but also afterward, and it is the contemplation of the management that the chief surgeon of the railroad shall have a department of his own and shall receive a salary or a fee for this work and shall have full charge of it.

I wish to say a word in regard to Mr. Rich, whose paper was to have preceded mine, and who represents the same railroad, that he has taken a great deal of interest in this matter and is giving it careful attention, and while it is not probable that this change will take place within a year, because matters of this kind must be duly considered and all the facts obtained before a department can be established to this extent, yet I believe eventually the Boston & Maine Railway will have a department of this kind. I am happy to state to the members of the association that the New York Central Railroad which, like many other roads, almost threw cold water on the association and its members, has appointed a committee, who are investigating this matter all over the country, and as to my friend from the West (Dr. Getz), who has the personal examination of the employes of the road he represents, I shall be glad to have some member of our organization meet him at some time and find out what that examination is. I wrote to the general manager of the Big Four road, asking him for blanks, which I saw in the daily paper, which were to be issued and which would be a criterion under which all of these examinations are to be made, and I received no reply from him. Whether there is such an examination on the Big Four I am not able to say. I think probably they are perfecting one. While there is an examination for sight and hearing, it is only a part of the physical examination that should take place. There is no doubt but what a man who is physically qualified to-day may be in one or two years hence physically disqualified. I know of a man in the railway service who became epileptic and of whom it was necessary to notify the management, because he was liable to run over anything. Such men, when they are the entrusted servants of a railway company, imperil the lives and health of others. Such cases as these have led to the conditions which we have in connection with the Boston & Maine Railroad to-day.

In speaking of the loss of the index finger and some other things of that nature, it leads me to be a little critical. In a certain way I am a fatalist, and I know when a man is constantly getting hurt he is unsafe to himself, to the public and his co-employes. I could give the names of more than twenty men whom I have advised to leave the service, and I have said to them that if they continue in the service they would sooner or later be killed, and some of them have been killed. One young man within three months was injured three times, and within six months he was run over and killed. I believe there is such a thing as warning people, and that this department should have the power to quietly get rid of such people, and not think of having them on the railroad unless they are competent.

Dr. Getz: I will answer Dr. Guthrie's ques-

tion, so far as it pertains to the railroad I represent. The local surgeons, as well as the general surgeons, who make these examinations, receive a fee of one dollar for each examination. Of course it is small. If the applicant is accepted the fee is deducted from his wages. If he is not accepted the company pays for it and considers that they are well off in getting out of the case at a dollar. All the examinations made by local surgeons I pass upon before the employe is recognized as an applicant by the company.

Dr. John H. Curry of Toledo, Ohio: I was very much interested in this paper and largely because of the direction which it took. I am firmly convinced, from my experience, that railway managers are very much like other men, in that they are willing enough to act when they are convinced that the action is to their benefit, and papers and discussions of this character materially influence the managers of railways, as well as legislation, and it seems to me the suggestions contained in the paper with reference to having efficient employes on our railroads cannot be questioned. One point raised in the paper is a very vital one, namely, that the condition of the employe should be known, if possible, before he becomes connected with the railway service, so that he cannot sue the company for injuries alleged to have been sustained while in the employ of the company and collect damages therefor.

But along this line there are a few other questions, and one is the question of competency. I have had very much to do in a special way, so far as the examination for sight, hearing and color is concerned, and I have found some remarkable things in my experience in that line. I find that even in states where legislation has been enacted compelling, under severe penalty, that certain examinations be made, that the law has been so constructed that it can be, in a sense, evaded. I speak now with reference to hearing, sight and color sense. These examinations may be made in a way which the company selects, and in many cases we have not been educated to believe it of any consequence, for the reason that examinations have been turned over to a clerk. Now it would seem that if these tests were made under the supervision of a competent man and the clerk instructed what to do, the results ought to be comparatively fair. Notwithstanding all this it has been my fortune to meet with the most dense, absolute color-blind persons that it is possible to find, who carry in their pockets a certificate showing them to be all right and having been examined by this method. I have repeatedly found this to be the case. Not only that, I have found men and rejected them whose vision did not exceed, under the most favorable conditions, 20-70, and yet they have had a certificate for competency, and had gone through this examination. I take it there is fault somewhere along the line when things of this kind occur. On the other hand, they make these examinations in some instances conform to the law.

If the results of the examinations are as I have found them in many instances, there is no question but what they amount to nothing. I think the whole matter should be placed in the hands of the surgeon himself, running down from the chief and not handed over to a clerk. Some of you may say that if the tests are given the clerk, and he follows instructions, the results ought to be the same. They are not, however, as I have found from experience. Of course, there are many other things that might be discussed in connection with this subject, and I think many times great injustice is done to employes as far as color sense is concerned. The clerk who conducts these examinations is something of a machine. He follows the directions and that is all, and he is liable to reject a man who has perfect color sense, but who may be ignorant of the names of colors. I was very much pleased with Dr. Conn's paper, because it opens up a field which ought to be presented to the railway management in order to bring about a reform in these matters and have the examinations made properly.

Dr. James H. Letcher of Henderson, Ky.: I would like to ask Dr. Curry what method he recommends for color vision.

Dr. Curry: I recommend Holmgren's method, which, when properly handled, is the most practical of all methods.

Dr. W. H. Pepler of Toronto, Can.: I desire to emphasize one point that was brought out by Dr. Conn, and that is, the importance of careful training of all employes of railways. I consider that we, as railway surgeons, are

the ones that should recommend to the managers of railways that a course of training be given to fresh employes. One of the speakers (Dr. Hoy) said that surgeons should attend to the business of their own department. Personally I consider this the work of the surgical department of the railroad.

The Canadian Pacific Railway have to pay for accidents that occur to their employes, and is it not right for the railway surgeon to recommend that those men be trained so that fewer accidents will occur, and then the railway would not have to pay for them. I think I am within the bounds of correctness when I say that nearly fifty per cent of the accidents we have are from freshmen, men who have never had a day's training, men who go to work braking and do not know the first thing about it. They get their hands or other parts of the body caught and injured. If these men had proper training these accidents in many cases would not occur.

Dr. James B. Hungate of Weeping Water, Neb.: I am very much interested in this subject. I am only a local surgeon and I have not had much experience with these things. I wish, however, to relate a case in which I was called as a witness. I will give you the facts and then you can draw your own conclusions. I have known of a man who, I incidentally learned, had hernia while in the employ of the Missouri Pacific. He was afterward dismissed from their employ because of dishonesty. Some five or six years later he entered the employ of the Metropolitan Street Railway of Kansas City, shortly after which he brought suit against the company, and I was a witness in the case.

The facts of the case were these: He claimed that the railway company should pay him damages for incurring a hernia by lifting a table while in their service. My evidence in the case knocked the man out. Were it not for my testimony it is highly probable that he would have secured large damages from the railway company, because he said he had incurred a hernia while operating on their road. This is one instance showing the utility of following in the line of the doctor's paper. We, as railway surgeons, in calling the attention of the railway managers of the country to such things, are not interfering with their business, but we are simply telling them something of which they should take note. Let them act as they choose after we have given them the facts in the case.

I recall the case of a railway brakeman who got hurt. On the first trip he made on the railroad he had his hand mashed. I dressed the wound and sent him to a hospital. Shortly after this he was put on the road again and had an accident the next trip, and a third time he fell into my hands after an accident. I learned that he was an immoral sort of fellow, and he became almost insane when I began to administer chloroform. All of his bad characteristics appeared then and I had great difficulty in controlling him so as to perform the necessary operation. I amputated his hand. This man should not have been put in the employ of the railway company in the first place. These are only two of scores of instances that come under the observation of the railway surgeon. I think it would be well for us to take proper note of these things. We ought to have systematic physical examinations, and they should be conducted by competent men, so that we may be able to ascertain the personal equation of every employe. We should examine a man as to his mental make-up and ascertain whether he is a fit man. In other words, we should take the man as a whole, and not as a man with eyes and ears alone.

Dr. Wm. D. Middleton of Davenport, Ia.: In our examinations of employes of the Rock Island Railroad we have discovered some strange things. We discovered one man that was color blind, very much deficient in vision, and who had never had any accidents occur. There was one engineer especially who was defective in vision and he was shielded by his conductor. When they got near a station the conductor sent out a brakeman to see that the engineer did not smash anything. Now, if thorough and systematic examinations were made, those men would be weeded out. We have encountered two or three cases of hernia such as the previous speaker described. In our physical examinations a man is stripped precisely as he would be for the military examination, and his defects are noted. We have a skeleton outline on paper. We have our examinations made by specialists in those lines, as, for instance, an oculist to examine the eyes of employes, and an aurist to exam-

ine the ears. It is true the examination fee is very small, it being one dollar. Notwithstanding this small fee, I believe we get first-class examinations.

Dr. John M. Dodson of Chicago: An incidental question in connection with this discussion has suggested itself to me, and it is this, whether or not the medical profession throughout the country are thoroughly qualified to make these examinations. Being very familiar with the curriculum of medical schools, I have been struck with the small amount of attention which is given to a thorough physical examination. Healthy students are not prepared for examination for the detection of pathological conditions by a thorough and practical familiarity with the normal healthy condition, and I think it would be a good thing if this and other similar associations would request medical schools to introduce into their curriculum a course in practical physical examination of normal subjects. This could be easily accomplished.

I would suggest, for instance, that in the sophomore year of the present four-year course that each student be required to thoroughly examine at least twenty of his fellows from head to toe. I would have him provided with half a dozen or ten blanks, calling for a complete description of a man in every respect, and have him fill out the blanks. For the remaining ten I would have four or five blanks from various insurance companies, so that they may become familiar with the various forms, and four or five blanks from the railway company, so that they may become familiar with the normal body as well as with the definite plans which are adopted by different organizations. I think this suggestion would appeal to medical educators, because not only is it a splendid preparation for this sort of work, but it is an ideal preparation for ordinary physical examination and methods of diagnosis in ordinary practice. The making of such an examination is not a matter of theory. A man might read the whole literature on the subject of physical diagnosis and yet not be able to make a proper physical examination, because he can only become familiar with it by actual practice. While we know clinical material is not abundant, healthy material is always plentiful. It seems to me such a plan would inculcate thoroughness and would be of great value all around.

Dr. Conn (closing the discussion): I feel greatly gratified at the free discussion my paper has elicited. I purposely avoided all detail, believing that every person who has this work to do will work it out for himself. It is not probable for us to be unanimous with reference to adopting any one form or blank for use at first. It is a matter of education and the subject is one in which I believe we are all deeply interested, because if we have any part of the work of the railroad to do, or are working for the management, we certainly should have the interests of the road at heart or else we are not doing our duty to the road which employs us.

In regard to education for this work, I agree with the last speaker, although it would be far from my duty to suggest that it become a part of the curriculum of our college education. It is quite possible that it could be done. I have taught hygiene for many years in one of our colleges; I have also lectured upon railway surgery, and the bringing of the two things together has suggested itself to me. Further than that, it has been brought to my attention by the managers of railways asking me questions, whether people who sustained injuries had some physical defects at the time they were first employed by the railways. Those of us who have had anything to do with the employes of railroads for many years know that there are many employes who have physical and mental defects—men we would not employ personally to do anything which we know was in the nature of a responsible position, and where others might be injured by reason of their negligence.

I will not take up your further time, but simply wish to thank you for the courtesy which you have given me, and the liberal manner in which you have discussed my paper.

FRACTURES OF THE SUPERIOR MAXILLA.*

By Dr. Allen Staples, Dubuque, Iowa.

Fractures of the upper jaw are of rare occurrence, but as a rule their results are apt to be serious; they may be produced indirectly by falls on the face, but more commonly are

* Read before the fifth annual convention C. M. & St. P. Surgeons, Chicago, Oct. 7, 8, 9, 1897.

caused by direct blows and are usually compound. The kick of a horse is perhaps the commonest cause of these fractures, and of this the classical case recorded by Richard Wiseman in his "Chirurgical Treatise" (1794), is a good example: "Here a boy eight years old received such a blow on the middle of his face that he appeared at first dead and afterward lay in a prolonged coma.

"When I first saw him," says Wiseman, "he presented a strange aspect, having his face driven in, his lower jaw projecting forward. I knew not where to find any purchase, or how to make any extension. But after a time he became sensible and was persuaded to open his mouth. I saw then that the bones of the palate were driven so far back that it was impossible to pass my finger behind them, as I had intended, and the extension could be made in no other way. I extemporized an instrument, curved at its extremity, which I engaged behind the palate, and having carried it a little upward, used it to draw the bone forward, which I did without any difficulty, but I had hardly withdrawn the instrument when the fractured portions went back again. I then contented myself with dressing the face with an astringent cerate to prevent the afflux of the humours; I likewise prescribed bleeding, and some hours afterward I had an instrument better constructed to reduce the large mass of displaced bone to its proper position. I had it held by the child's hand, by that of its mother, or of an assistant, each for a certain time. Nothing else was done. Thus by our united attention the tonicity of the parts was maintained; the callus was developed, and in proportion, as it became solidified, the parts became stronger, the face assumed a good appearance, certainly better than could have been hoped for after such marked displacement, and the child was entirely cured."

I beg leave to submit the two following cases of such fractures that have come under my care:

On March 13, 1893, there came to my office M. M., a robust farmer of about 30 years of age, who had received a kick in the face from a mule, and whose face was literally collapsed. Besides a longitudinal fracture of the upper jaw he had a frightfully mangled lower jaw, in which there were three distinct fractures, one vertically on each side of the mouth in the region of the bicuspids, and a third running transversely clear across the bone and separating the teeth from the base of the bone.

The pieces were brought into position with great difficulty and after an impression had been taken with wax and plaster-of-Paris of both jaws, a splint somewhat after the style of the Hammond wire splint was fashioned, and was fastened to the firmly implanted teeth in either fragment by means of steel wire. Underneath the lower jaw was placed another splint of sheet lead. We then applied an ordinary four-tailed bandage, with a chin rest of leather covering the lead splint. The patient was fed by means of a bit of rubber tubing. A few times during the course of the treatment the steel wire had to be tightened.

At the end of about eight weeks the splint was removed and all dressings, with the exception of a supporting bandage, were dispensed with. The patient was discharged June 6, 1893, with a result comparatively good. The teeth, however, did not play over each other as well as we could wish.

A second and very desperate case was that of J. W., aged 38, a machinist, who, while sharpening a tool at an emery wheel, was severely wounded by the bursting of the wheel. A large piece of the stone hit him in the face. This man was taken by my associates, Drs. Boothby and Lindsay, to Finley Hospital and temporarily dressed. The accident occurred on the afternoon of August 25, 1897. I saw the patient on the evening of the same day. There was, in addition to severe wounding of the soft parts, fracture of the left malar bone, fracture of the nose, and four distinct compound fractures of the upper maxilla, two transverse, one in the median line of the mouth and a separation of nearly all of the alveolus containing the teeth and a depression of the same about half an inch. It also seemed probable to us that there was an injury to the base of the skull, as the man was in a semi-comatose state for some hours. Indeed, at first we rather expected he would not live, as in addition to considerable shock the hæmorrhage was very free.

For the first few days the dressings were limited to packings of gauze and suturing of the soft parts; besides we applied some wire

to the fragments in the endeavor to hold them together. The patient having rallied unexpectedly from his injuries, we on the third day made an attempt to secure better apposition of the fragments by means of vulcanite splints made after the manner of Gunning splints, and which we had a dentist fashion. These splints consisted of vulcanite plates, which we applied to the fractures and secured by wiring them to the teeth. Of course the patient was etherized for the purpose.

For about a week we kept these plates in position, but they did not give satisfaction, as the fragments would not stay well in position. It was therefore evident that something further must be done. It occurred to me that the fragments of bone could be drilled by a dentist's drill and wired together by silver wire. I had heard of this method being employed in fractures of the lower jaw, but never in that of the superior maxilla. Accordingly, on the tenth day ether was administered by Dr. Lindsay and the different fragments of bone were drilled through and a good deal of silver wire was used in bringing the parts into coaptation. At last we had secured a satisfactory method to retain the fragments in place. An ordinary roller bandage with chin support was then applied. The patient was then nourished upon liquid diet through a tube, the mouth being washed out with listerine twice daily, and the further history of the case was uneventful. The silver wires were removed about the fortieth day, when good union was found to have been obtained. The patient now is able to talk and chew fairly well, but the range of movement of the jaws is materially lessened. The patient now complains of the loss of both smell and taste; why this should be so I do not know.

These cases emphasize the teaching of Malgaigne, who says: In fractures of the upper jaw there is one principle which surgeons cannot too carefully bear in mind, that is that all splinters, however slightly adherent, should be scrupulously preserved, as they become reunited with wonderful facility."

Integumentary Resistance.

By R. H. Cowan, M. D.

The remarkable resistance or resilience the integument frequently exhibits when subjected to tremendous pressure is well known to surgeons who have had experience in railway traumatisms and is well illustrated in the following cases:

Case I: Brakeman V., arm caught between deadheads. Considerable swelling; skin intact; bone apparently uninjured. No pulsation at wrist. Hoping this might be due to effusion, I had decided to make an incision to relieve pressure, and as an exploratory procedure, when I thought I recognized a condition which would render amputation necessary. When I expressed this conviction to two surgeons who were present, they, knowing my unwillingness to amputate unnecessarily, seemed to think me suddenly bereft of reason. I called their attention to the condition I had observed. Dorsum of hand swollen —swelling terminating abruptly at metacarpophalangeal articulation. Resistant on pressure, and unlike the swelling of the arm, which was more or less yielding. An incision was made over the artery, along middle third of humerus, with the result I could find nothing but pulpified tissues and blood clots. The hour being late, and hoping against hope, I decided to defer amputation until morning. Explaining to my colleagues what I considered the significance of the swelling, I related a previous experience in which a similar condition had puzzled me, until an incision over the dorsal swelling revealed the muscles, or some of the muscles, of the forearm tightly curled up under the integument. Whether from the impact above, or powerful contraction due to the stimulus of injury, or from both causes, I cannot say. The bellies of the muscles were, in a measure, stripped of their muscular tissue. The correctness of my diagnosis as to this remarkable condition was verified the next day. The arm itself was simply a mass of clotted blood and muscular debris inclosed in an unbroken integument. The peculiar condition of the muscles described I have never observed except in these two cases. But injuries of every degree to the deeper structures, with an unbroken integument, have been common, though in many instances I think the vitality of the skin was completely destroyed at the moment of the impact, as evidenced by the pallor the skin usually exhibits in such cases.

Case II: Brakeman S., thigh caught between deadheads. Skin intact. Injury deemed so trivial I was not called until some days later, when gangrene had supervened. Femoral artery had been ruptured.

Case III: T. N., run over by loaded boxcar, wheels passing over upper part of abdomen. Skin slightly abraded. Spinal column completely severed. Died in a few moments. —Clin. Recorder.

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MEETING OF THE EXECUTIVE BOARD.

A meeting of the Executive Board I. A. R. S. was held at the Great Northern Hotel, Chicago, on July 30.

Dr. F. J. Lutz of St. Louis was elected chairman and Dr. Louis J. Mitchell of Chicago editor. The salaries of the treasurer and secretary were fixed for the year following. The arrangement with the proprietors of The Railway Age for publication of The Railway Surgeon was renewed for the ensuing year. Some miscellaneous business was also transacted, after which the board adjourned.

THE VALUE OF "FIRST AID."

We learn from the English railway journal "Transport" that an ambulance team belonging to the Great Eastern Railway has won the challenge shield offered for competition in ambulance work for the second time. This is a remarkable record and leads one to inquire why something of the kind cannot be instituted here While first aid classes and instruction in ambulance work flourish in England, where they are almost fads and patronized by royalty and the nobility, our American soil affords little nourishment for these praiseworthy institutions.

The St. John Ambulance Association, which has the Prince of Wales for its president, was founded some 20 years ago and has control of the ambulance work in Great Britain. Instruction is given by means of lectures and demonstrations to firemen, policemen, soldiers, railway employes, workmen in quarries, factories and any others who may wish to attend or be benefited. There can be no doubt that an immense amount of good has been done and many lives saved by persons who have attended these lectures.

During the torrid spell in Chicago in the summer of 1887 the policemen on the patrol wagons were furnished with ice caps and a supply of powdered ice and did good service during the sunstroke season by commencing the treatment immediately. Many of the patients had recovered consciousness when they reached the hospital and were eventually saved. The ambulances and doctors on duty during the World's Fair again demonstrated the utility and value of such service, yet efforts made to perpetuate it ended in the collection of a few hundred dollars only, which was finally turned over to the health department. In New York City the ambulances attached to the hospitals are a prominent feature of philanthropic work there, and heroic tales are recounted of the ambulance surgeon's deeds at fires, fallen buildings and the like. Yet no concerted plan of action like that referred to previously is in vogue.

A moment's reflection will show that no class of persons will be more benefited by instruction in "first aid" than railway employes, and we are glad to find that a start has been made on the Grand Trunk Railroad to furnish the employes with such instruction. At the late meeting of the I. A. R. S. Dr. Chas. R. Dickson of Toronto presented a paper on "First Aid Classes for Railway Men." From

this we learn that first aid classes for employes of the Grand Trunk Railway were instituted by our worthy president, Dr. Bruce L. Riordan, some six years ago. These are being still kept up; they have been extended to the police and it is hoped to include the firemen shortly.

There is no reason why such classes should not be found at every railroad center in the United States, large or small, for as Dr. Dickson points out, the object of this instruction "is not to rival, but to aid the medical man." A train crew who have attended these classes may contain (to quote again from Dr. Dickson) "a brakeman who may on occasion save a life by controlling an otherwise fatal hæmorrhage, a fireman who may prevent a simple fracture from becoming compound, or a conductor who knows how to carry out artificial respiration when a train has gone down an embankment and into a river."

Extracts and Abstracts.

Trauma as a Factor in Producing Malignant Disease.

By D. S. Fairchild, Clinton, Iowa.

The frequency of carcinoma and sarcoma has led pathologists, since the beginning of the new era in medicine, to seek for the cause or causes of these diseases.

Following the discovery of the influences of micro-organisms in producing inflammatory and septic processes, and particularly in producing tubercular new formations, came the efforts to show the possible relations of some micro-organism, yet undiscovered, to carcinoma and sarcoma, but as yet without success, and we may, very properly, in the present state of medical science, leave out of consideration the whole question of the parasitic origin of malignant growths, and confine ourselves to the practical clinical question of how these new formations develop, and under what influences they appear and extend. We may or may not accept Cohnheim's theory of a tumor matrix being the remote cause of all tumor formations. The practical question for us to consider in this discussion is the influences of trauma, injury or irritation, in producing malignant growths.

It is a well-accepted fact in pathology that carcinoma is formed from the irregular and riotous proliferation of epithelial cells from epithelial surfaces, or from the epithelium of glands or their ducts, or, if we accept Cohnheim's theory, from included prenatal embryonic cells, and sarcomas from proliferating connective tissue elements originating in the same manner.

Assuming a predisposition from inheritance, age or circumstances in the development of carcinoma, we may easily accept the prolonged influence of irritation as a direct exciting cause of epithelial proliferation, giving rise to cancer. While trauma in the form of continued irritation may thus prove a sufficient cause for the development of cancer, it is much more difficult to accept a single application of force—as a bruise—as a sufficient cause.

In relation to sarcoma, the conditions are different. A single blow or bruise received on a part may so disturb the processes of nutrition as to give rise to a proliferation of connective tissue cells, and thus lead to that form of developmental energy which gives rise to a sarcoma. This being accepted as true, the important question next arises: What relation in time must the injury sustain to the development of the disease? In my opinion, it is not enough to find the two isolated facts of an injury and some time in the future, it may be one, two, three or more years, find a sarcoma developing at the seat of a remembered blow or other injury. We must find a disturbance in the normal physiological resistances, manifested by local symptoms which bear a definite and continuous relation to the injury; otherwise we must assume the long past injury and the newly developed tumor as being coincident. If it could be shown that sarcoma was, as a rule, due to injury, or if it was true that injuries were frequently followed by sarcoma, then it could be said that when a sarcoma developed, therefore an injury had been received; or if an injury had been received, therefore it is to be assumed that a sarcoma will probably follow, the relation would be clear. But, as a matter of fact, sarcoma frequently develops without any history of trauma; on the other hand, a great number of all kinds of injuries occur without producing malignant disease of any kind; therefore the mere fact of a previous injury and the development of sarcoma establishes nothing, unless a direct relation can be established between the two. For instance, a fracture of a bone happens, union takes place, the callus is removed, the bones become strong, and the physiological resistance is apparently restored and no inconvenience is felt; afterward, from one to five years later, a sarcoma appears in the seat of the old fracture. To assume that the fracture was the trauma sufficient to develop the disease is, to my mind, untenable. If, on the other hand, the fracture is followed during any period of the formation of new

embryonic elements incident to repair, or before the excessive nutritive processes have come to an end and the normal physiological balance has been restored, the appearance of a sarcomatous growth may reasonably be assumed to have its origin in the cells which were apparently intended to repair only, or in the tissues which have not yet reached a normal physiological type. When this condition is definitely reached it may be difficult to determine, but it seems reasonable to assume that it would be reached certainly in a year. If during the year following the injury there are no evidences of morbid processes taking place at the seat of injury, it is, I believe, safe to say that no malignant disease will arise from the injury. It may be assumed, however, that a point of least resistance may be formed, which will at an indefinite period in the future become the focus of a morbid growth, but if this is true, can it be said that a patient has ever definitely and safely recovered from an injury? or must it be held that an injury is a constant menace to the individual during the remainder of his life? I cannot believe that this is the teachings of either pathology or practical experience.

The appearance of malignant growths in scar tissue involves other propositions. According to Thoma, "Investigations into the etiology of cancer show beyond a doubt that there is a predisposition to cancer formation which increases with age. This probably plays the principal part in the etiology of cancer. The hereditary nature of such a predisposition would explain the fact that many tumors frequently reappear in the same family." The existence of a scar may determine the location of the cancer in the presence of the predisposition, but not cause the growth. Another factor should be taken into consideration in this connection, viz., scar tissue is liable to long and repeated irritation, and, having less physiological resistance than normal tissue, would more strongly invite the location of the morbid growth and determine the development of a cancer when the predisposition was so slight as to otherwise pass. The scar factor would be more influential in this direction if future investigations should show that the coccidia, like bodies found in carcinoma, are really parasitic organisms and cause cancer.

Thoma states that "no one has yet succeeded in producing cancer or other tumors experimentally by the use of trauma, toxic or infective agents, and innumerable injuries in the human body, including such as have suppurated for a long time, heal without disturbance. Among the relatively few cases, however, in which wounds and scars gave origin to tumor formations, there is quite a number where the injury healed up and only gave rise to formations of a tumor in the scar after many years had elapsed." To my mind, this evidence is strongly in support of the hypothesis that the scar serves as the means of locating the tumor, having the so-called predisposition as the underlying basis.

J. Bland Sutton, on the closing page of his work on tumors, says: "I have not deemed it necessary to discuss injury (trauma) as a cause of tumors. Cohnheim has ably disapproved this in the famous lecture on tumors."

From a clinical standpoint there is much evidence that injuries serve to some extent as exciting causes of cancer; most writers on surgery hold to this view, but the exact relations are not very clearly stated. Erichsen states: "A blow or other injury of a part often appears to be the direct determining cause of the development of a primary cancer. Cancer of the breast is commonly attributed by the sufferer to the infliction of an injury." It is not quite clear whether this is Mr. Erichsen's unqualified opinion or the interpreted views of patients; however, he reaches this very closely when he says that "it is, however, certain that direct external violence, and more especially long-continued irritation of a part, often stands in some important relation to the development of the disease."

Senn, who is a believer in Cohnheim's theory of a pre-existing tumor matrix of embryonic cells, is emphatic in his acceptance of truma as an exciting cause in the development of tumor, particularly sarcoma. In the presence of a matrix of embryonic cells, a trauma may excite a development in these cells which may prove to be a sarcoma. As to the time after the trauma when the sarcoma may begin to grow, we have only the general proposition to guide us that it may occur previous to the restoration of the normal physiological resistance in the part, i. e., at any time while the cells retain their embryonic type. This, I believe, is true; but is it possible to fix with any degree of certainty the time when the cells have reached the normal physiological type of resistance? If we are to be influenced by clinical experience alone, we may say that in certain cases that the time never comes, especially in cases where a malignant tumor appears at the point where a former injury has been received. Apparently the only guide we can safely follow is the evidence that a perfect histological and physiological restoration of the injured parts has been reached. If after this time a carcinoma or sarcoma develops, we must look for some other exciting influence.

In the March number of the Annals of Surgery there is a very interesting article from Dr. Coley of New York on this subject. Dr. Coley's large experience and abundant observations on malignant disease entitles his opinions to great weight. His paper opens up

very important medico-legal relations of the subject, and leads to the forming of professional opinions as to the possibilities which may follow a trauma. Coley, out of a total number of one hundred and seventy cases of sarcoma, found forty-six, or twenty-seven per cent, to be connected with trauma. An examination of the forty-six cases shows that sixteen of these cases did not show evidence of a tumor for a year or more after the injury. The fact that so long a period elapsed between the injury and the appearance of the growth, would at least throw a reasonable doubt upon the relation of the injury and the disease. If the sixteen cases may properly be eliminated from Dr. Coley's list, we shall have thirty cases in one hundred and seventy due directly or indirectly to trauma, or about eighteen per cent.

Lowenthal, who has made the most systematic study of this subject, collected three hundred and sixteen cases of sarcoma in medical literature giving a previous history of trauma. The interval between the injury and the appearance of the growth is not stated, and we are in the dark in relation to this very important fact. Lowenthal, however, states "that the trauma in itself does not furnish the real cause for the formation of a tumor is apparent from the fact that thousands of traumatisms are constantly occurring and but few tumors develop." Wolff's statistics of twenty per cent of sarcoma and twelve per cent carcinoma giving a history of trauma are defective for the same reason—that no mention is made as to the relation of time.

Harrison Cripps of London states that not more than seven or eight per cent of sarcoma would give a history of injury, and Cripps is a believer in trauma as a factor in developing sarcoma.

The foregoing appears to be a fair statement of the various opinions held as to the influence of injury in producing malignant disease. My own experience accords with the majority in relation to this subject, although my observations confine the influence of trauma in developing sarcoma to bones. In a period of fifteen years I have treated several thousands of injuries of various kinds without seeing one sarcoma or carcinoma develop in consequence, except in bone, and in two cases only have I seen sarcoma appear in this tissue. This observation, limited as it is, convinces me that the proliferation of cells incident to repair may take on the peculiar features of growth which lead to sarcomatous formation.

In the present state of knowledge of the etiology of malignant growths, it seems fair to assume that growths of epithelial origin as carcinomas, whatever the underlying cause may in the future be found to be, are greatly influenced in their growth by causes which disturb local nutrition or favor the proliferation of epithelial cells. This proposition finds support in the fact that certain glands and organs so situated as to function and position as to be particularly exposed to frequent or continuous trauma or irritation, or toxic influences, are especially predisposed to become the seat of carcinoma, but it is a matter of serious doubt if a single application of a traumatic influence ever is sufficient to cause a cancer, and I believe the question may safely be answered in the negative.

In relation to sarcoma, the clinical and pathological evidence is different. Sarcoma, as a connective tissue-cell growth, may be said to have its origin in any influence which excites a proliferation of connective tissue cells. This influence may be due to repeated irritation or to a single trauma, as a blow applied to soft tissues or to a fracture of bone. As a result of such trauma, embryonic cells may develop and assume the particular manner of growth characteristic of sarcoma, in the presence of a predisposition. But it must be presumed that the local disturbance has continued in operation from the time of the trauma to the appearance of growth.

It is not quite safe to draw an analogy between cancerous or sarcomatous new formations and tubercle. In tubercle we have a well-recognized micro-organism which seeks an especially favorable focus for development.

A point of lessened resistance may be established by a slight trauma, as an injury to a bone or a sprain of a joint, which may prove sufficient until the normal physiological nutritive balance is restored, after which the locus resistentia minoris disappears or ceases to exist. If in the future it should be discovered that a special micro-organism or parasite is the real cause of malignant growths, then the evidence will be different; but even then it will be necessary, in order to give definiteness to medical opinion, to fix some relation between the trauma and the appearance of the growth other than the two isolated facts, and it seems possible to give a scientific basis for our opinion by taking into consideration the questions of a physiological balance in nutrition and physiological types of resistance.—Tri-State Med. J.

Irrigation with Salt Solution and Other Fluids in Surgical Practice.

By Hunter Robb, M. D.

There exists a great divergence of opinion among surgeons as to the advisability of employing irrigation after abdominal section. While some prefer to irrigate after every operation as a routine procedure, the majority,

perhaps, deem it necessary to do so only in those cases in which bloody or purulent fluid has escaped into the abdominal cavity after the removal of a mass or in those cases in which considerable oozing from the separation of dense adhesions has taken place. It has been urged with some justice that where the escaped material is of a septic or of a malignant character, attempts to remove it by irrigation would in all probability spread it still further among the coils of the intestines and into other parts, especially in the upper portion of the abdominal cavity, whence it would be quite impossible to remove it by sponging. With this objection, which certainly demands consideration, I shall deal briefly a little later. Fortunately in many cases in which pus has been present, the escaping fluid contains no virulent organisms, so that irrigation in such cases could hardly do any harm.

The materials used for the purpose of irrigation are plain hot water, sterile salt solution and a variety of antiseptic fluids. In selecting such a fluid for irrigating the abdominal cavity we naturally look for one that promises the best possible results with a minimum possible amount of harm. Solutions containing germicidal drugs are open to the objection that they can never be of sufficient strength to destroy the septic material without producing local lesions or even general toxic effects from the absorption into the system of the chemical irritants which they contain. Experience has shown that the use of solutions of bichloride of mercury or of carbolic acid for irrigation of the peritoneal cavity must now be unhesitatingly condemned, not only on account of the local necrotic effects which are produced, but also because of the more or less grave symptoms of general intoxication which have been time and again observed. The experiments which have been made with dilute solutions of sublimate poured into the abdominal cavity of dogs, are too well known to need any description here. Even in human beings autopsies have shown that patients have died with intestinal ulcerations and peritonitis, or with lesions of the heart and kidneys, of which there was no evidence before the operation.

Of the numerous milder antiseptic solutions, such as one-half to two per cent solutions of boric acid, Thiersch's solution of salicylic acid and the like, it may be said that they possess no sufficient germicidal or inhibiting influence to justify their use.

Even plain hot water is said, with reason, to have a definite deleterious effect upon the tissues. It is a fact well known to microscopists that when fresh animal tissues are examined in plain water, the cells are found to be seriously altered, and as has been shown by repeated experiments, the red and white blood corpuscles are injured or completely broken down by its action.

In employing irrigation after abdominal operations, we aim not only at cleansing the peritoneal cavity, but also at producing such a stimulus that the effects of shock from a severe and long operation may, as fast as possible, be minimized. In normal salt solution we have an agent which offers these advantages and which thus far has never been shown to have any deleterious influence upon the tissues with which it is brought in contact. The solution should be made to correspond in specific gravity very closely with the normal serum of the blood. Hence the term "normal" or "physiological" salt solution. It is prepared by dissolving six grams (90 grains) of chemically pure sodium chloride in each litre (33½ ounces) of distilled water. The solution is then filtered into a clean flask which may hold about three litres and which is then stoppered with a plug of non-absorbent cotton. In order to prevent the deposition of dust on the rim of the flask, the cotton plug is securely wrapped around with a gauze bandage. After being heated over a Bunsen flame until it boils, the solution is immediately transferred to an Arnold steam sterilizer already heated to 100 degrees C. and allowed to remain there half an hour. The process is repeated on the two following days, to insure thorough sterilization. It can be made up in quantities of a dozen flasks or more and kept until needed. When required for use, two flasks are taken, one containing a cold and the other a hot solution. The contents of these are mixed in a sterilized glass graduate, to which a thermometer is attached, and which holds from 500 to 1,000 cc. The gauze and plug having been removed with due precautions, the cold salt solution it first poured into the jar and then enough of the hot solution is added until the thermometer shows a temperature of from 43 degrees C (110 degrees F.) to 48 degrees C. (118 degrees F.). The thermometer affords the only reliable means of testing the temperature of the water. The hand of the assistant or nurse supplies only a loose determination and, what is more important still, is liable to contaminate the hitherto sterile solution. This is a detail of importance and the careful observance of it should be insisted upon. The solution is either poured into the abdominal cavity directly from the glass graduate, or it can be siphoned through a glass or hard rubber nozzle attached to a piece of tubing. Sometimes where more force is required, a new Davidson syringe, previously sterilized in boiling soda solution, with a glass nozzle attached, may be employed. The Davidson syringe, suitable for this purpose, can be bought without the usual attachments for the irrigating

end, and in this way the cost can be materially diminished. The glass nozzle can be readily attached to the end of the tube, and its lumen, being so much larger than that of the ordinary nozzle, which comes with these syringes, will permit of a much freer flow through it, and besides, a glass nozzle can be much more easily sterilized.

In plastic operations irrigation is sometimes very necessary, and in addition to other advantages afforded by it, the necessity of sponging is done away with. A constant stream can be employed and be so regulated as to keep the field of operation free from the blood that would otherwise obscure it and hamper the operator. Here again salt solution is superior to all others. The solution is contained in a sterile glass jar fitted with a piece of rubber tubing which is provided with a hard rubber stopcock, as devised by Edebohls, by which the current is controlled. Instead of a glass jar a fountain syringe may be employed. This can be easily rendered sterile by being boiled in soda solution or by being first soaked in a 1-40 solution of carbolic acid and then rinsed out with plain sterile water.

To meet the objection raised against irrigation, that it might disperse the septic or malignant particles of material among the coils of the intestines, especially in the upper part of the abdominal cavity, it is safer in every case in which the presence of such infective material is suspected, to first swab out the abdominal cavity with pledgets of sterile gauze and afterward employ irrigation.

I have used salt solution for irrigating the abdominal cavity for the past eight years, and for the past three years I have left in the abdominal cavity from 300 cc. to several litres of salt solution at a temperature of 112 degrees F. after every abdominal operation, when not employing drainage. From observation of my cases I am convinced that this procedure undoubtedly diminishes the shock which generally follows a serious operation, and I also believe that it often diminishes the thirst of which patients so frequently complain after such operations. In those cases in which pus has escaped into the abdominal cavity I employ it according to the method recommended by Dr. John G. Clark, and in many cases in which large quantities of pus had escaped into the abdominal cavity, after the latter had been thoroughly cleansed, I have poured into the abdomen from 500 to 1,000 cc. of the salt solution and placed the patient in the position suggested by Dr. Clark in the treatment of this class of cases.

It has also been my practice for the past three years to use irrigations with salt solutions during plastic operations. Since adopting this procedure I have seldom met with any microscopical pus formation after plastic work, and I am led to believe that the irrigation with salt solution has in some way contributed to this result. In order to save time I am in the habit of sterilizing a sufficient quantity of salt in a test tube in the autoclave, or Arnold steam sterilizer; I then place the necessary quantity in a sterile fountain syringe or glass vessel and add the requisite amount of sterilized water.

The only objection to using this fluid during plastic operations would seem to be that it rather prevents the clotting of blood from the cut vessels. I do not think, however, that this disadvantage is of any great importance, as with a very little experience the operator will soon recognize what vessels it is necessary to ligate, and how far pressure will suffice.

Normal salt solution is easily made; it is cheap and it seems to me that its value as an irrigating fluid has up to this time been somewhat underestimated and that its more general employment in surgical and gynæcological operations is indicated. I certainly cannot recall to mind an instance in which its employment has done any harm in my hands. On the other hand, I cannot say this of other solutions which have been in vogue at various times, and I have come to the conclusion that salt solution possesses certain advantages of its own while being without the disadvantages belonging to other fluids used for irrigation.—Columbus M. Jour.

Report of a Case of Penetrating Wound of the Abdomen and Thorax.

By William H. Fisher, M. D., Toledo, Ohio.

Wm. M., aged 33, American, under the influence of alcohol, received a stab below the ribs on the left side. The injury was inflicted at 3 a. m., after which he walked some three blocks. The case not being deemed urgent by his physicians, he was not removed to the hospital till the following morning at 9 a. m., July 7, 1896, when the writer was summoned. The following were the conditions that obtained:

The patient, a strong, well-nourished man, of fine physique and medium height, being semi-conscious, very anæmic and pulseless, with respiration impeded and hurried, and heart action weak (160 per minute), was immediately removed to the operating room and chloroform was administered. Inspection revealed on the left side of the chest a large fluctuating mass, in the center of which an incision two inches in length had been united by suture. Removing these and turning out blood clots, as the hæmorrhage persisted and was excessive, the original incision was enlarged, paralleling the transverse colon in anticipation of its injury. The knife had penetrated the abdominal cavity, cut the colon at

the splenic juncture, involving but little of the peritoneal portion, but had injured the transverse colon at its attached borders between the layers of the mesocolon three-quarters of an inch. From this point, passing upward, it cut the diaphragm two inches, passing thence into the thoracic cavity and penetrating two inches in length and one inch in width. The critical condition of the patient necessitated haste, and these were the procedures employed: The incision in the lung was firmly packed with gauze, four silk sutures were placed in the diaphragm from the abdominal side, a gauze drain was passed to the extremity of the cut in the bowel and the abdomen closed. Shock and hæmorrhage had produced a practically moribund state and most energetic measures were employed for restoration. The heart action gradually improved, the rate oscillating from 155 to 130. Vomiting was persistent and frequent, continuing for the next four days. The patient was unconscious the rest of the day and night.

July 8—Gas and blood clots were passed per rectum. There was subsultus with marked jerking of the whole body, due no doubt to the free exhibition of strychnin. The pulse fell from 120 to 94 and the respiration was from 32 to 40.

July 9—No change was noted. Subsultus was slight.

July 10—The bowels moved three times in the morning, black in color and full of blood clots. The stool was normal in the afternoon and continued so. The pulse and respiration were normal. The temperature at no time was subnormal nor ever above 101 degrees F.

July 12—The gauze was removed from both cavities. There was no hæmorrhage from the lung and but slight soiling from the intestinal contents. Diaphragmatic union was complete.

July 13—The dressings were soiled by fæcal discharge, and so continued for the following three weeks, when the fistula closed. With the exception of extensive suppuration of both arms from hypodermics, nothing of further interest occurred. He was discharged August 5, 1896.

The primal consideration in prognosis was a fatal termination from shock and hæmorrhage, but these abated in severity. The second element of danger was a septic peritonitis from leakage of intestinal contents into the abdominal cavity.

Owing to the critical condition of the patient during operation and the length of time necessary to repair the injury of the bowel affected in such localities, it was deemed advisable to pack with gauze, thereby establishing a temporary drain and preventing, if possible, any leakage, the anatomic site of injury favoring this technic.

It was the writer's intention, had the patient rallied, to reopen the abdominal cavity and repair the injury to the bowel. Not being in a condition for further operative interference until the third day, and no signs of peritonitis manifesting themselves, the expectant plan was adopted. Removing the gauze on the fifth day, it was evident that a fistula would be the result. Causing some concern at first, it was a source of gratification to note the changes that demonstrated repair. The discharge and suppuration ceased at the end of the third week. Had not this favorable termination ensued the abdomen would have been reopened and the cut edges of the bowel reunited, and omental flaps, as devised by Senn, grafted upon the uncovered portion of the bowel. Fistulæ of intestines between layers of mesocolon are prone to remain permanent, producing much damage.

Fistulæ of the colon present more difficulties in healing than those of the small intestines, while for fistulæ of the attached border of the colon failure after failure has been the result after suture.

T. A. McGraw of Detroit sums up pithily the various phenomena operating against a successful termination when he says: "The prognosis of all wounds of the large intestines is doubtful with whatever care they may be repaired. The greater rigidity of its walls, which do not accommodate themselves easily to the infolding by sutures, the unequal thickness of the wall, the impervious closure of its upper end by the ileo-cecal valve and the obstruction offered at the lower by rigid sphincters, the consequent accumulation of gases and distention of the bowel, and finally the character of contained fæces, which not only irritate the wound by their presence, but also mechanically tear it apart, all tend to destroy the most carefully effected union. When, in addition, the wound is located on the attached surface, where the peritoneal coat is wanting, we have a case of surgery which requires all the resources of our art to make it successful."

Treves, in his "Operative Surgery," speaks of a case of wound of this border which two operations failed to cure, and other surgeons have had to confess failures in securing union at these points.[1]

Passing now to the diaphragmatic injury, two inches in length, which was united with four silk sutures, closing entirely the abdominal from the thoracic cavity and uniting firmly; the "solution of continuity" of the diaphragm produces grave constitutional disturbances represented by a rapid irregular pulse due to disturbance of the pneumogastric nerve, a peculiar kind of respiration in which the thoracic accessory muscles are called into forcible action, loss of visible movements of

1. Annals of Surgery, August '96.

the diaphragm during the respiratory act, a sinking in of the epigastric and hypochondriac regions of the abdomen, great dyspnea, severe vomiting, intense pain, increased by a paroxysm of coughing and hiccough.[2]

An equilibrium being established, these symptoms abate; the wound does not unite, but remains open and often increases in size. Hernia will be the result, and if the wound be small immediate strangulation may take place. In this connection it is of interest to note that the diagnosis of strangulated diaphragmatic hernia, as a rule, has been made at the autopsy.

In Lichtenstern's collection of 250 cases five were correctly diagnosed before death.[3] The diagnosis of a rupture of the diaphragm having been made, it is incumbent upon the surgeon to perform a laparotomy and unite the cut surfaces. Dennis has collected eight cases of rupture of the diaphragm in which celiotomy was performed, all of which recovered. With the exception of this case, the writer has been unable to add to this collection. In packing the cut surface of the lung the purpose was to control the hæmorrhage temporarily till the amount of damage done could be discerned. It answered the purpose so effectively that it was allowed to remain. Had the writer been compelled to resect the ribs and stitch up the exposed surface, as advised by Tillman, a fatal termination would have resulted.—Cleveland J. of Med.

Treatment of Wounds.

By J. E. Summers, Jr.. M. D., Omaha, Neb.

Wounds of joints are conveniently divided into two general classes: 1. Simple; those in which the skin overlying the joint is unbroken, or if so, the wound is only superficial and does not penetrate the joint proper. 2. Compound; when not only is the skin wounded, but the wound extends through the tissues into the joint.

The first class of injuries are designated as sprains and contusions, and embrace almost all injuries not accompanied by a permanent displacement of the articular surface, or a disorganization or serious breaking up of the bones and their cartilages going to form the joint.

Sprains result from indirect violence; the muscles guarding the joints being relaxed or caught unawares by some unexpected act, as a false step. Any violent twist which results in moderate or severe movements beyond the normal limitations of function stretches or tears the capsule, synovial membrane, and ligaments in a degree depending upon the violence exerted. The symptoms of a sprain are those common to injuries in general, viz., pain, swelling and interference with function. Except in the mildest kind of sprain, the pain is intense immediately upon receipt of the injury. Swelling occurs rapidly and is due to the accumulation of synovial fluid within the joint cavity as well as the accumulation of blood and exudative fluids from the torn and irritated blood vessels without the synovial sac. Not infrequently the synovial fluid is mixed with blood. Swelling usually reaches its maximum during the first twenty-four hours. The acute pain experienced on receipt of the injury is gradually changed into numbness, which, however, is immediately replaced by agonizing pain upon any attempt at motion of the joint; especially is this so when ligaments have been torn. In such cases pain on pressure is most severe over the points of insertion of torn ligaments which usually give way at these places, sometimes stripping or chipping off small pieces of periosteum or bone with them.

Prognosis is uncertain, depending in the main upon proper recognition of the importance of the injury and an intelligent application of the aids of surgery to the restorative powers of nature. At best, many sprains are only imperfectly recovered from because the nature of the injury itself so changes the delicate complexity of the joint that a return to the normal is impossible. Fibrinous adhesions may form because of the hæmorrhage into the synovial sac. The injuries to the capsule, ligaments and tendons belonging to or crossing the joint may result in such permanent thickening as to absolutely eliminate the natural strength and motion of the injured joint. Sometimes, although there is no visible change in a joint after apparent recovery from a sprain, special points of tenderness may be discovered; the surface may be abnormally cold and the joint somewhat, often quite, stiff and painful when used.

Treatment.—This should be directed toward relieving the pain, modifying the swelling and hastening absorption of the traumatic exudate into and surrounding the joint; at the same time placing lacerated and torn tissues into the most favorable condition and position for rapid repair.

More relief from pain can be obtained by the employment of heat than cold, and the practice is more agreeable to the patient. The writer usually in all cases of sprain, when seen within a short time after an accident, advises the long-continued and frequent immersion of the injured joint in water as hot as can be borne. It is still better to add one tablespoonful of mustard powder to each gallon of water. This kind of heat relieves pain, lessens hæmorrhage and irritative exudate within and surrounding the joint. The preliminary treat-

2. Dennis' Surgery, Volume III, p. 234.
3. Dennis' Surgery, Volume IV, p. 214.

ment may be kept up during the first eight to thirty-six hours. In the intervals between the immersions the joint should be surrounded by a copious quantity of cotton wool held in place by a bandage applied sufficiently tight to give support, but not to cause pain. The joint should be elevated so as to favor the return circulation of the blood. After the end of the first twenty-four to thirty-six hours, all swelling, the result of the injury, has taken place. The object of treatment at this time is to hasten absorption of the fluids causing the swelling and at the same time prevent all irritation tending to keep up a pouring out of blood and fluid exudate from torn and dilated vessels. Gentle massage and frictions with an avoidance of passive motion is valuable, and at this time also some pressure may be employed by means of a flannel bandage laid over a little cotton wool. As the swelling begins to disappear, the massage may be made more vigorous and very gentle and moderate passive motion begun. Should this more active treatment be followed by continued pain it should be abolished and massage and the bandage relied upon until most of the swelling has disappeared. At this time, varying in length from five days to two weeks after receipt of the injury, two lines of practice may be employed; the one only applicable when there has been no extensive tearing of ligaments and capsule; the other being the only rational practice if such injury has taken place. If, upon moderate passive motion after the swelling has gone down, there is no considerable reaction, the indication is to give support and then allow of a moderate and gradually increasing use of the joint. Support can be obtained by using a flannel bandage, or, better still, a more permanent and reliable dressing is made from adhesive plaster put on so as to make even pressure, admit of limited motion, but not to constrict and interfere with the return circulation. Adhesive plaster dressing can also be used with decided advantage as a primary dressing in sprains of moderate degree where there is little tendency to swelling. When rather active or violent reaction follows passive motion, the joint should be immobilized by plaster-of-Paris until repair of torn tissues has taken place. In ten days to three weeks the plaster-of-Paris can be removed and massage with passive motion renewed and a gradual use of the joint allowed. Some form of support should be worn for a considerable period after beginning the use of a joint that has been sprained.

Contusions of joints follow falls, blows or kicks. They may result in a mere bruising of the overlying joint structures or in subcutaneous tearing of not only some of these tissues, but also of the joint capsule and synovial sac; even bruising of the cartilages themselves. Hæmorrhage around or into the joint accounts for most of the swelling in these cases. Treatment is by hot fomentations, pressure and massage. Antiseptic incisions for the evacuation of effused blood may be employed with advantage in rare instances of large extra-articular blood accumulations. Aspiration may also be of advantage in a very small number of intra-articular blood and synovial accumulations. Both practices to be of advantage should be done early.—West. Med. Rev.

A Brief Resume of the Structures, Physiology, Symptomatology, and the Treatment of Lesions Involving the Shoulder.

By Thomas H. Manley, M. D.

It may be well at the beginning to inquire, first, what are we to understand by the "shoulder?" Why, any elementary treaties on anatomy, it may be said, will answer that; but it will not, though it may go to almost endless lengths in the differentiation and description of structures.

For example, the general impression is that there is but one joint here, the "shoulder-joint," but there are three; the most mobile, the costo- or pleuroscapular, being quite devoid of ligaments or synovial lining; the most powerful, the scapulohumeral, like the former, is essentially a muscular articulation, scant in ligament supports; a joint with a very limited osseous articular surface, having but a very limited, immediate osseous, articular connection, and yet, so constructed as to enjoy a greater protection against violence, by a bony vault, than any other arthrodia in the body. The joint connecting the clavicle with the scapula, limited in its radius of movement, is entirely ligamentous.

Essential Constituents of the Shoulder.—The outer end of the clavicle and the surgical neck, or upper segment of the humerus, are essential constituent parts of the shoulder, and if they were so regarded and described for clinical purposes it would enormously simplify the symptomatology and the therapy of many lesions, involving or contiguous with the shoulder girdle. The muscular, osseous and other structures entering into the composition of the scapula and the scapular ends of the clavicle and humerus, are provided mainly by the same vascular and nerve supply, and are so inextricably bound together by structures, reciprocally acting and depending on each other, that any gross pathological changes involving one is certain to be reflected through the other.

Similarity in Symptomatology.—Thus, in a fracture through the acromial end of the clavicle, the shoulder droops, and the arm is

fixed, but the same phenomenon attends a dislocation—humeroscapular or scapuloclavicular.

Pathological Lesions.—Rheumatism or neuralgia of the shoulder simultaneously cripples all three joints. It is, therefore, apparent that when lesions in the various component parts of the shoulder are generally attended by a community of symptoms in many particulars, in order to precisely locate their situation and correctly interpret them, a deliberate, cautious and critical examination is indispensable. Even then doubt as to the precise character of them may remain, although in skilled or experienced hands this must be rare. Perhaps there is no large class of injuries which entail a greater responsibility than those at the shoulder.

Necessity of Accuracy in Diagnosis.—It is not so much to know how to treat them as to know what we are treating.

It is true that fractures attended with no marked displacement, or those through the scapular apophysis, may do as well under massage, bandage, and a sling, as with any complicated adjustment; but, to stamp one of these "only a sprain," and prescribe a liniment may involve the practitioner in serious trouble. These mistakes are only too common. Within one month this last winter, 1897-1898, two cases of fracture through the coracoid process came to my service at the West Side German Dispensary, which had not been previously recognized. They had been sent to me by their physicians because of the obscure character of their injuries.

In this class of cases it is better not to place much reliance on what the patient says, but strip him bare, and then go on with a rigorous examination, the patient placed in the various attitudes, using an anæsthetic if necessary.

After injuries at the shoulder we are to look chiefly for three things:

Has our patient a sprain, a luxation or a fracture?

Let it be remembered that, clinically, what we designate a sprain is any injury which presents no tangible or visible evidence of a fracture or dislocation. In many so-called "sprains" the bones may have been dislocated and sprung back into place; there may be fracture, linear or stellate, with no displacement; in all there is subcutaneous effusion of blood, with more or less laceration of nerves. tendons, ligaments or muscles.

If, after a proper examination, we detect a fracture or dislocation, should we in all cases proceed at once by violent means to set or reduce it? In my opinion, after having dealt with a large number of these cases, there is rarely, if ever, an urgent demand for immediate action in the way of decisive measures.

The patient has already suffered violent commotion, and there is nothing lost by a temporary delay. Let the limb be placed in a comfortable position and the patient treated. Muscles about a joint are much the same as those inclosing the membranous-urethra; they may be coaxed, but not forced.

There are two things which are practically axioms in the treatment of dislocations and fractures, viz.: in the former, be cautious of using misdirected great or protracted force; in the latter, to avoid too much pressure, or too protracted immobilization.

In shoulder injuries of a severe character treatment embraces two divisions, the immediate and the consecutive.

After all acute inflammatory reaction has passed off, and the residum of deposits are absorbed, serious impairment in function, with pain about the articulation, may remain.

When this is pronounced or exaggerated, with a tendency to chronicity, let us inquire into the patient's general state; let us suspect under various circumstances the influence of climate and season, malaria, rheumatism, neuralgia, syphilis, or tuberculosis.

For the trophic changes in the parts, hyperæsthesia, pseudo-ankylosis, adhesions, effusions, pararthritis, or paresis. we resort, in the consecutive stages, to douches, friction, the bandage support, passive motion, electricity, etc.

In sprain cases, worked up for litigation, deception is quite impossible if we examine critically into the state of the muscles and the other soft parts about the joint. In all severe injuries of the shoulder, by stripping the chest and contrasting both limbs before, behind and on the sides, and examining critically with the eye and hand, deception cannot well be practiced.—The Clinical Recorder.

An Old Traumatic Dislocation of the Hip in a Child Reduced Through an Incision.

Dr. H. M. Sherman: The dislocation was of six months' standing, in a child four years old. Efforts at immediate reduction had failed. The femoral head was on the dorsum of the ilium, and the leg was in the usual characteristic position, but there was more mobility than is usually seen in recent cases. Further efforts at manipulative reduction had failed, as they had done before.

An incision was made along the posterior edge of the tensor vaginæ femoris, the head was found and cleared of surrounding tissues. To effect reduction it was necessary to cut all the muscles from their insertions, from the tip of the trochanter anteriorly to the lesser trochanter. The joint capsule had collapsed and was folded in the acetabulum, and the round ligament was not to be found. The

capsule was incised along the upper border of the acetabulum and peeled from the acetabulum floor, and the head pulled down and into the acetabulum. The limb was put into a position of 25 degrees of abduction. Deep gauze drain was inserted and deep muscle and superficial skin sutures were put in. It was impossible to suture the capsule and the deepest muscles, but the position of abduction somewhat approximated their cut ends. A plaster-of-Paris spica with a perineal strap was next applied. Healing was uneventful and the child began to walk almost as soon as the splint was taken off. Now, three months after the operation, the child walks easily and well and with but a little catch in the step. The hip has ample motion, flexion 72 degrees, but as the limb flexes it abducts about 27 degrees; extension 130 degrees, full and free, but in this position the limb is slightly rotated out; abduction of the limbs is about even; outward rotation is even, but inward rotation is restricted one-half the usual amount.

References to the literature on the subject shows that traumatic dislocation of the hip in children is not common, is usually reduced, and that the record of successful cases where old dislocations had been reduced by operation contains but a few instances. This case is one given to me very kindly by Dr. Clark, and it has proved to be, by its results, rather a rare case (after paper). I go over this simply to show that it is not a common condition, and the results in those cases where there is no reduction after the injury have not been, up to 1890, particularly favorable.

The condition in which I found the capsule explains the failure to effect the reduction at the time of the injury; the ligament had been entirely torn away from the femur, and this being left without a fulcrum, the bone could not be manipulated properly, and the head wobbled around instead of entering the acetabulum. Now, as the child lies on the table (showing case), she lies quite easily, the limb in line with the trunk, but a little rotated out. As she flexes it, there is also some abduction, but the flexion is ample, full 70 degrees. Abduction appears to be about even, but there may be a little more adduction tension in the right than in the left muscles, but very little at any rate. There is now, as you can see, a little catch in her step, and while it is difficult to estimate this, I believe that it is less than it was. It is probably due, as is the outward rotation, to the section of the entire inward rotation group.

There was a boy at the Children's Hospital in the service of Dr. Merritt, about ten years of age, who, up to the time he fell down a well, had been perfectly healthy. Afterward he had a very bad limp, and he was brought to the hospital. The diagnosis of dislocation of the hip was easily made; manipulation failed and reduction was effected through an incision, and after some interruption in the healing the boy got well and was very much improved in his gait. I have not been able to learn the exact state in which he was when he left the hospital, beyond the fact that the operation wounds were healed, and that he walked with a limp, but did not need a crutch or cane. This makes two cases of old traumatic hip dislocations which have been reduced through incision within the last year in the Children's Hospital.

Dr. Clark: I would like to ask Dr. Sherman what will be the future pathological and physical condition in this case?

Dr. Sherman: The condition in the hip-joint now must be that there is no round ligament, that the capsule is probably abnormal in implantation, but it grasps the neck and so is holding the femoral head; the synovial membrane is not an active structure, and the point upon which we are to be congratulated is that the cavity was not obliterated and that the head is freely movable. I do not see why there should be any change expected. We cannot expect that the capsule would be moved from its present location on the neck of the femur and a new round ligament grow; perhaps there would be an increase, a gradual increase of mobility, and the flexion become better by and by. If she is trained to walk with an even step her gait will be improved; as Judson has shown in cases of disability at the hip, that the patients taught to walk with an even step will be benefited. It is a matter of habit in a child, just as the soldier is taught to walk straight. I do not expect much further improvement. I had forgotten that I did not make any notes at my first examination, for after that I did not see her until she was on the operating table. I had forgotten that the leg was turned in, and so have credited her with more motion than she really had, although she had considerable.

Dr. Clark: She could bend the knee, but there was considerable impediment in the hip.—Cal. Acad. of Med., in Pacific Med. J.

Irrigation of wounds should never be performed with a rubber fountain syringe which has ever been used for the giving of an enema. Rectal peristalsis during the administration of the enema often forces fæcal matter through the rubber tube and into the bag. This may easily be demonstrated by giving an enema with a glass irrigator bottle, when fæces may be seen to enter the bottle and mix with the water therein contained. A new nozzle or tip is not, therefore, a sufficient guaranty of asepsis. Always use a new syringe.—Georg. J. Med. and S.

THE Railway Surgeon

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CONSERVATIVE SURGERY IN CRUSHING INJURIES.*

BY JAMES G. HUNT, M. D., UTICA, N. Y.,
Attending Surgeon Faxton Hospital; Division Surgeon N. Y. O. & W. R. R. Co.

Gentlemen and Fellows: Another year brings us together for scientific advancement, and for social enjoyment, and it gives me great pleasure to be able to address you as President of this branch of the New York State Medical Association. I am impressed with a deep sense of gratitude and responsibility by the estimate of the honor you have conferred upon me, and my first duty is a very pleasant one, to thank you for this compliment.

I frankly confess that I was taken by surprise on learning of my election to such a position, feeling that you could have selected one more competent than I, and more familiar with the methods of procedure and workings for the purpose of presiding over a body of learned and scientific men as you are. In the past you have been presided over by men of ability and distinction, and therefore it renders it difficult for me to attempt to fill the chair.

It is not my intention to call to your notice anything essentially new, but to direct attention to a subject that is fast gaining ground, growing in favor, and is approved by the best surgeons of the day. I have reference to "Conservative Surgery in Crushing Injuries."

I have been professionally associated with railroad men for many years, and have been called upon to do the surgical work for a number of different mills and factories for over twenty-five years. An injury to an employe in a large corporation often means very much; it means claims for damages many a time, and especially where the injured person is a woman, as is often the case in factories. The loss of a finger disfigures her for life, and lessens her chances for matrimony; when she comes before a jury she enlists their sympathy to that degree that large sums are granted, so that these same mills and railroad companies are looking for the man that will do as little cutting as possible, and save all; in that case the person has no claim.

In my experience in one mill alone for over twenty-five years I have so managed the cases (and there were over six hundred) that not a single case for damages has ever occurred. The amount of time and work it has taken has well repaid the company for the surgeon's services. One suit for damages, even though the company was successful, and showed that it was purely negligence on the part of the employe, would cost the company many times the amount of a surgeon's bill in counsel fees.

We are often called to look at a crushed finger, hand or foot. At the first glance there seems to be no hope for saving the member and there is a disposition to amputate. It is almost always best to wait and see what can be done. The loss of a finger may seem of very little importance to a surgeon, but to a man who earns his living with his hands, it is a most serious matter. I have made it a rule not to sacrifice even the smallest part of a finger when there is any possibility of saving it.

In presenting this subject to your notice, I only hope to place before you some facts obtained from my experience in the treatment of many cases which have come under my observation. I once heard a famous surgeon remark that "A quaint brother might be inclined to place the subject of conservative surgery in the category of 'old chestnuts;'" granting this to be the case, it is nevertheless a sound chestnut.

Many amputations are hastily made; for instance, a compound comminuted fracture,

* President's annual address before the Northern Branch New York State Medical Association, delivered at Little Falls, N. Y., July 20, 1898.

with muscles and deep tissues badly lacerated presents itself. As a rule, amputation is the one idea that the surgeon's intellect grasps from the scene before him. On glancing over the field of surgery it is difficult to find a surgeon who cannot point to at least one or two cases that have come under his observation, in which the prerogative of amputations has been abused. Is the injured limb always looked over and examined carefully and minutely? Is not an operation hurried by the thoughts of having a beautiful stump? The surgeon should keep this one great truth before his mind's eye, viz.: "That to have saved one limb is more to his credit than to have removed, no matter how skillfully, a hundred."

I have heard a good many clever things said about conservative surgery, but one of the best of them was—and it will not be out of place to repeat it here: "In surgery, laziness and bigotry sometimes call themselves conservative." Opposed to this are discontent and love of novelty. We have been taught a good many things and have learned one thing—that almost anything is possible in the use of antiseptics in the crushing of limbs. We meet with a class of injuries in factories, mills and on the railroads that is met with nowhere else in life. We find lacerations and contusions of soft parts, crushing and comminution of bone. There is one principle to guide us, and that is, where we have a warm foot, or a warm extremity, to invoke antiseptic precautions, put the limb in the best possible condition, and wait. If there be circulation of blood, there will be a re-establishment of the parts, and where you have blood you have building material. You can wait with safety if you know that the site of the injury has been perfectly asepticized.

With all the modern conveniences at our command at the present time for wiring bones together, and removing all loose bone, we can put these injured limbs in good condition, and if we are in doubt at any time we should wait. As I once heard a good surgeon with years of experience say, "To teach a man to save a leg or an arm, when it is almost torn from his body, is the province of conservative surgery, to cleanse, watch and wait for nature to build up and save the limb, that is our business, that is science, and that is conservative surgery." Most people are afraid that when a surgeon is called in, no matter how slight or grave the injury, he will advise cutting off the limb; they little understand that the surgeon's duty to the company that employs them, as well as to the patient, is to practice conservative surgery. I have in mind now quite a large number of cases where the fingers were nearly severed, hanging only by a few shreds, and were sewed up; they are in fairly good condition, so much so the men have the use of them, and can do a good day's work. It only shows what can be done with proper care and strict antiseptic precautions.

It is not my intention to tire you with a lengthy paper, but in conclusion I will cite a few of the more important cases that have come under my care professionally. I have also prepared a tabulated form of that class of cases known as contused and crushed wounds that I have treated.

Starr Case.—November 11, 1892, I was called to see Mr. S. S., an employe of the J. H. Williams Co. On arrival I found him lying on the floor in a semi-conscious condition. I obtained from his fellows a history of his going to the elevator shaft to ascertain the whereabouts of the elevator; in so doing he leaned forward looking toward the bottom of the shaft. While in this position someone started the elevator from above, which in its descent caught his head, crushing it between the elevator and a large bar across the entrance.

I made an examination and found his head was a shapeless mass, with many scalp wounds, and fractures of the temporal, zygomatic portion of malar, occipital, nasal, superior maxillary and palate bones. All the teeth of the upper jaw were torn from their sockets, and there was profuse hemorrhage from the ears, nose and mouth. While at the shop I applied a temporary dressing, and ordered him removed to the hospital, but they insisted on taking him home.

At this time I had little hope of his recovery, as he was suffering severely from the shock. After some five or six hours reaction set in, and I visited and thoroughly examined him and removed the blood clots from the cavities. I feared meningeal hemorrhage, also pressure on the motor areas of the brain, but I found all the functions of the

extremities and body unimpaired. Therefore trephining for clots and pressure was unnecessary. He had partial paralysis of the upper lip, due to severing of a number of fibers of the facial nerve, there was loss of motion in the right side of tongue, which indicated injury to the right hypoglossal nerve. There was also a loss of sight on the inner side of the left eye, and the outer side of the right, indicating injury to the optic chiasm. There was also loss of taste on the right half of tongue, due to injury of the chorda tympani and glosso-pharyngeal nerves, and an impairment of the sense of smell, caused by injury to the olfactory nerves.

I applied a temporary dressing; the next day I applied a plaster cast to head and face. I visited him from day to day and kept especial watch over the functions of his limbs, etc., which would indicate any pressure on the cerebrum. He was fed on liquid food by means of a tube, but experienced difficulty in breathing through nose; I thereupon introduced a cast of dental wax into the nose, with holes for breathing purposes, and also applied a cast to the fractured nasal bones.

After leaving cast on face and head for some two weeks or more it was removed; there was firm union of the bones, but he suffered slightly for some time with a partial facial paralysis, but finally fully recovered by the use of electricity. He recovered entirely with the exception of the full sense of smell. It is now five years since the accident, and he is well and back at his old position.

William N., age 17, brakeman O. & W., had been working on road only from 7 a. m. until 11 a. m. of the same day, at which time he had his forearm caught between the deadblocks, caused by the engine slackening up. He was removed to St. Elizabeth's Hospital. When I arrived I found him in the operating room, and proceeded to make thorough examination. The patient was anæsthetized and an incision made on the flexor side of arm near elbow for the purpose of removing the flexor muscles which had been completely crushed and protruded through many openings in the integument.

The question that presented itself was, "Shall we amputate?" and the answer from a number present was "Yes." Then others said "No." "But if we do not amputate, will the limb be a useful one?" Owing to the age of the patient, only 17, though he looked like a man of 22, it was decided to wait and see what could be done. All loose muscles were carefully dissected out, and everything possible was done for him. The arm was packed with iodoform gauze and the patient placed in the ward.

The next day I visited him, removed the packing and found his arm doing very well. I began to have hopes of saving it, as he was desirous of having me do. I visited him daily and used irrigation, and in two weeks he left the hospital. He called at my office afterward, because he had a large ulcer, which was cared for until it was entirely healed.

We had considerable difficulty in preventing ankylosis of the wrist and fingers, but by passive motion he has entirely recovered the use of his hand, excepting that portion of his fingers supplied by the flexor profundus digitorum muscle, which prevents him flexing the distal upon the middle phalanx.

A number of years ago I was called to see Mr. S., a night watchman on the N. Y. C. & H. R. R. R., who was struck on the head with a hatchet, sustaining a compound fracture of the skull in two places. It was about 12:30 a. m. when he was hailed by two car thieves. On walking toward them they assaulted him and beat him over the head until he was unconscious. He was brought to the station on a handcar by some tramps who found him on the track. The patient was placed on a stretcher and taken to his residence. I was summoned about 3 a. m. and found two depressed fractures of the skull. There was a "V"-shaped cut above the ear; one of the fractures of the skull was oval in outline and nearly as large as a silver dollar; the other corresponded somewhat to the shape of the hammer part of the hatchet. The wound on the side of the head had the appearance of being made with a downward blow of the hammer, the upper rim of the hammer striking the skull first. He was semi-conscious, his condition very critical, and but little hopes of his recovery could be reasonably entertained.

I decided to trephine his skull and remove the pressure from the brain. Here I was confronted by a poorly lighted room, and no

assistance, so I determined to do it alone, and proceeded by making a large horseshoe flap, turned it back, removed a number of pieces of bone, and elevated the remainder of the depression. I also removed at least a teacupful of brain matter, irrigated the cavity, and packed it with sterilized gauze.

Shortly after he regained consciousness, and I visited him daily, irrigating the cavities with normal salt solution and redressing with sterilized gauze until complete recovery after some seven or eight weeks.

On October 21, 1893, James D., a brakeman on the N. Y. O. & W. R. R., was injured by falling from a car. He was brought to St. Elizabeth's Hospital, where I proceeded to make an examination, and found he had received a scalp wound six inches long and a compound multiple fracture of the right leg, involving the upper, middle and lower thirds of tibia and fibula, including the astragalus and the os calcis, also a crushed toe on the opposite foot.

The patient was anæsthetized, and, with the aid of an assistant, I sutured the scalp and amputated the toe. It was a very serious question in regard to his leg; it looked as though amputation was the only thing to resort to, and it was a question in my mind if the limb could be saved. If it was, I feared it would be useless. After considerable pleading on the part of the patient's brother, and after due consideration, I decided to reduce the fracture; which I did, and applied a gypsum cast to leg and foot. He began to improve rapidly after a few days, and very encouraging results followed my treatment. In some three weeks the cast was removed, and he was allowed to walk about with the use of a cane. The bones had entirely united and he again had a good and useful limb. At first there was considerable ankylosis at the ankle-joint, but this was soon overcome by passive motion. The last I heard of my patient was that he was back on the road as fireman on a shifting engine.

May 21, 1895, was called to see W. D., a bell boy at the Butterfield House, who had had his arm injured. He was in the elevator and intended descending, so he raised the cable, at the same time closing the door, but his fingers became entangled in the screen, and he was unable to withdraw them. During this time the elevator was descending, and as it passed from under him he was left hanging by the hand, and his arm was caught between the elevator and the floor, with the whole weight of the elevator resting on the arm.

I found that he had sustained a large lacerated wound from the top of the shoulder into axilla and along the under surface of arm to elbow. The muscles and blood vessels were badly lacerated, and there was profuse hæmorrhage. I at first feared that the brachial plexus had been severed, but on examination found them intact.

He was removed to Faxton Hospital, anæsthetized, and the wound sutured, excepting where it was impossible to approximate the edges. This, of course, left many large ulcers, and I thought I would be obliged to do skin grafting, but after some days I found the wound was doing well, also the ulcers, which were irrigated with normal salt solution for the purpose of stimulating the granulations. The patient was discharged from the hospital and called at my office for a few weeks, until the ulcers entirely healed in, when he was able to go back to his old position with as useful an arm as before.

SUMMARY.

Parts Crushed.	No. of Cases.	Amputated.
Fingers	566	112
Thumb	38	14
Hands	98	22
Forearm	4	1
Arm	42	14
Shoulder	14	—
Head	30 Trephined	5
Leg	24	12
Foot	20	6
Toes	42	10
Spine	4	—
Pelvis	5	—

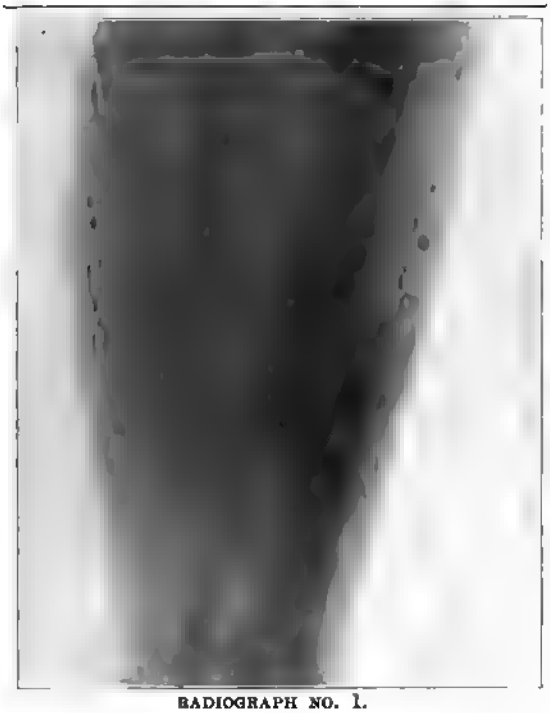
Total number of chushes, 887. Total amputations, 191.

In purchasing surgical instruments select by preference those which are large enough and strong enough to be used with comfort. Toy instruments, such as may be found in many pocket cases, are often worse than useless. Let your instruments be few, simple and efficient.—Georgia J. Med. and S.

FRACTURE OF THE LEG—SHORTENING AND DEFORMITY AFTER UNION.*

By Dr. J. F. H. Sugg, Clinton, Iowa.

May 10, 1897, A. C. G., American, laborer, aged 58 years, sustained a fracture of both bones of left leg, by being violently struck upon the fibular side of the limb. The fracture was about the middle of the leg. The soft tissues were not greatly contused, but two small flesh wounds were produced, which, however, did not expose the bone. The accident occurred in a neighboring village. The local surgeon was called, who promptly conveyed the patient to Agatha hospital, this city, and summoned a member of the hospital staff to his assistance. The two surgeons dressed the limb and made extension by weight and pulley. One week later they put the leg in a plaster of Paris dressing and continued the extension. June 1 the attending surgeon being about to leave the city for an absence of several weeks, gave me the foregoing history and requested me to assume charge of the case, with the mutual understanding that the dressing should not be disturbed for a period of two weeks. The Doctor also informed me that no unfavorable symptoms had occurred since the patient's admission to the hospital, but that he had not been able to satisfactorily reduce the fracture, and he feared that the fragments were not in good position. No change in treatment nor of dressing was made until June 16, more than five weeks after the infliction of the injury, when I removed the plaster cast. I found the flesh wounds healed; the leg but little swollen; the fracture ununited, and the leg fully an inch and a half shorter than its mate. With the patient under ether, all efforts to extend the leg and bring the fragments into apposition were futile. With the usual surgical precautions I exposed the ends of both tibial fragments by free incision. The tibial fracture was very oblique and directed downward and backward, the fragments were over-lapping and a broad band of soft tissue was interposed between the broken bone surfaces. The division of this band permitted the fragments to glide into perfect apposition by the use of only moderate extension. The fibula was fractured about one inch lower than the tibia. This fracture was also oblique and in the same direction as in the larger bone. With a drill I freshened the ends of the fragments and then brought all broken bone sur-



RADIOGRAPH NO. 1.

RADIOGRAPH NO. 2.

* Read at the fifth annual convention C, M. & St. P. R. R. Surgeons, Chicago, October, 1897.

faces into perfect coaptation under guidance of the eye and direct touch. While the parts were so held I drilled the tibial fragments from before backwards and at right angles to the line of fracture, and secured the fragments in position by means of a steel nail snugly fitting the drill hole and driven firmly into the compact bone of the upper fragment.

This treatment rendered the leg firm and rigid, held all broken bone surfaces in perfect apposition, and restored the leg to its normal length. The wound was sutured and the leg enveloped in a plaster of Paris dressing provided with the usual fenestra at the site of the incision. No untoward symptoms followed—neither swelling nor pain required attention. The wound healed promptly. July 14—twenty-eight days after the operation—the plaster dressing was removed and the nail withdrawn. The leg was in perfect condition. A large callus enveloped the bones at the seat of fracture, and union was quite firm. There was no shortening. The leg was scrubbed and enveloped in a starch bandage from the knee to and including the foot, making, when dry, a light and firm dressing. July 28 the patient was given crutches, but cautioned not to bear weight upon the injured leg. August 11 the starch bandage was split and removed, and the leg again found in perfect condition—union firm—no shortening. The starch dressing was reapplied and fastened with tapes and the patient instructed to bear weight upon the injured leg and to gradually accustom it to doing its duty. No further attention was given the case until September 9, when the patient was about to leave the hospital.

The patient was walking with one crutch. The leg was strong and free from pain, but fully half an inch short. I was unable to detect any other change in the leg since my previous examination—now, as then, the callus was large, hard, and encompassed the bones at the seat of the fracture. While the shortening was not enough to inconvenience the patient it was quite sufficient to annoy me. Wishing, if possible, to ascertain the true state of affairs, I took the patient to my private office and examined the leg with the aid of the X-ray and fluoroscope. The shortening had surprised me, but the revelations of the fluoroscope amazed and bewildered me. By it the direction of the fibular fracture was shown to be downward and forward; the posterior surface of the lower fragment resting upon the anterior surface of the upper fragment, with shortening of about an inch. The tibial shadow confirmed the clinical history and showed a slight over-riding of the fragments, producing shortening of about half an inch.

Radiograph No. 1, taken at the time from an anterior exposure with the foot slightly inverted, illustrates the description I have given of the fluoroscopic shadow. I admit that this radiograph might be a dangerous witness against me in a suit for malpractice—dangerous because its shadows might be misinterpreted and their truths perverted. Knowing that the fracture of the fibula was not correctly shown by either the fluoroscope or radiograph, I devoted much time to an honest endeavor to solve the mystery.

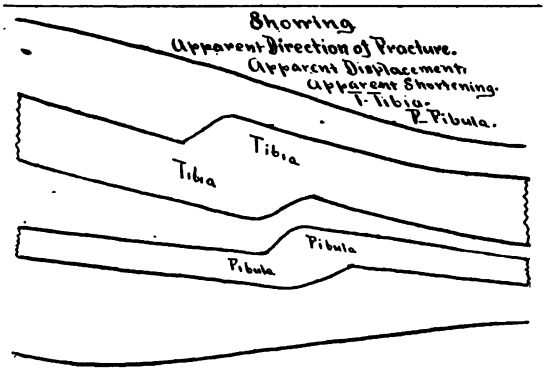
October 23 I again succeeded in getting the patient to my office. I then viewed the fracture from every accessible point with the aid of the fluoroscope, and I also took radiographs Nos. 2, 3 and 4[1], and I believe that I reached a correct explanation of the enigma. Radiograph No. 2 was taken from a direct anterior exposure, and shows both bones to have been fractured obliquely downward and forward, the posterior surface of the lower fragments resting upon the anterior surface of the upper fragments, respectively, and also shows shortening of one and a half to two inches. A false witness in every particular. Not one of the conditions represented ever existed. During the same hour radiograph No. 3 was taken from an anterior exposure with the foot slightly inverted (same position as No. 1) and, notwithstanding the fact that six weeks intervened between the taking of Nos. 1 and 3, the tibial fracture shows the same in each. There is no mistaking the direction—obliquely, downward and backward; nor the displacement—a slight overriding; nor the shortening—about half an inch. A truthful witness. The fibular fracture shows a much larger callus in No. 3 than in No. 1, but in other particulars the two radiographs are identical.

Radiograph No. 4 was taken from an exposure of the inner side of the leg, and shows

1 These have not been reproduced.—Ed.

but a slight departure from the normal in either bone, and is valuable only in illustrating the importance of taking radiographs from different points of exposure. I have made two pen sketches, "A" showing the apparent direction of fracture, displacement and shortening, as shown by radiograph No. 2; "B," showing actual line of fracture, actual displacement and shortening, and showing the intermediate or permanent callus to be the cause of the X-ray deception. The sketches will explain themselves.

It is evident that the deception is not due to an optical delusion nor shadow caprice, but to the fact that the provisional callus is transparent, and the definitive or permanent callus opaque to the X-ray. The provisional callus being transparent to the X-ray, casts

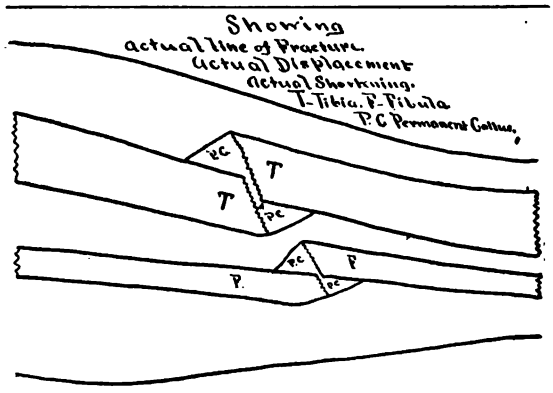


CUT A.

no shadow, while the definitive callus being opaque to the same ray, casts its shadow upon the fluorescent screen or sensitive plate, changing the outline and giving false impressions concerning the original characteristics of the fracture.

Bone and the definitive callus being practically equally opaque to the X-ray it is, therefore, impossible to distinguish the one from the other by means of the fluoroscope or photographic plate. They will tell the truth, but not the whole truth—they will show the present, but not the original condition. I resorted to various means to procure a radiograph of the provisional callus, but with very indifferent success. By subjecting a number of superimposed plates to a single exposure, I obtained upon one plate a faint outline of the callus, but too indistinct to be seen by the inexperienced, and from which I was unable to procure a print. The provisional callus remains transparent for months.

In this case the definitive callus was opaque September 9 when radiograph No. 1 was taken, and the provisional callus was still transparent October 3, as shown by Nos. 2, 3 and 4. The transparency of the provisional callus is well to remember. There may be a callus limiting motion of a joint; obstructing circulation; producing pain or paralysis by compressing a nerve, and neither the fluoroscope nor sensitive plate be able to detect its presence. In young children the transparency of the cartilaginous lamina between the shaft and epiphysis gives an apparent separation of the parts when viewed with the fluoroscope or upon the photographic plate. The greater danger, however, comes from the permanent callus. It disguises the truth and covers the facts with



CUT B.

obscurity. The transparency of the provisional callus and opacity of the permanent callus is, I think, a strong confirmation of the histogenetic theory that the provisional callus is formed by the indirect method, the osteoblasts being first converted into cartilage and later (if at all) transformed into bone, while the permanent callus is produced by the osteoblasts being converted directly into osteoid material.

I believe the X-ray to be an inestimable gift to surgery and a boon above price to humanity, but it has dangers which we, as surgeons, must learn to recognize and avoid. As a precautionary measure I would suggest that the surgeon procure a radiograph of a fracture within a few days after its occurrence, or, within a few days after he assumes charge of the case. As a greater means of safety the fracture may be reduced and the dressing applied and the radiograph then taken, showing not only the nature of the fracture, but

also the character of the surgeon's work. True, the X-ray will not show the conditions of the soft parts, but an early picture of the fracture will give a reliable witness with which to explain and refute any damaging appearances produced by the caprice and masquerading of the permanent callus. Eventually the radiograph will be admitted in evidence by our courts, and the wily lawyer and unscrupulous patient will hasten to make use of it to assist them in accomplishing dishonest ends. "Things are not always what they seem" and "appearances are deceiving" are dicta fully exemplified in the shadow pictures of the X-ray, of which those I have submitted are good illustrations.

The fracture I have reported would be classified as a complicated fracture—complicated by the flesh wounds on the side of the leg, which were the only visible or ascertainable complications, and which healed promptly and did not complicate, leaving, to all appearance, a simple fracture. The actual complication, the soft tissue interposed between the broken bone surfaces, was not discernible. It may then with truth be said that complications do not always complicate a fracture, and that simple fractures are not always simple. The displacement and shortening occurring so long after apparent perfect union emphasize the fact that fractures are most perverse and dangerous injuries to treat. The X-ray is a useful friend and valuable witness, but he who would have it for his servant must study with care its language and learn by experience to correctly interpret its shadows. The judge who admits the radiograph in evidence must use caution and be ever on the alert to prevent justice from being blinded instead of enlightened by its testimony.

I am aware that it is more pleasant to report perfect than imperfect results, and more gratifying to receive praise than criticism. I have endeavored not to discuss my subject, but to give the facts in a "Gradgrind" fashion, leaving the discussion for the members of the association. Permit me to say in conclusion that my patient has recovered a useful leg, practically as good and useful as before it was broken. He is not conscious of any shortening nor does he know that the bones are not in line. When I saw him October 23 he walked without pain and with only a perceptible halt. He stated that he had been "bee hunting," and assured me that he had walked within two weeks fully one hundred miles without suffering any inconvenience from the broken limb. "Where ignorance is bliss 'tis folly to be wise."

LATER.

About the middle of April, 1898, the patient came again to my office and I took radiograph No. 5 from the same point of exposure as No. 1, taken September 9, 1897—fully seven months previous. The provisional callus was still present but does not show in the radiograph—proof that it continued to be transparent to the X-ray. The leg shows increased muscular development indicated by the greater depth of soft tissue covering the bones. It is also noticeable that the permanent callus has completely obscured the original characteristics of the fracture. Who would imagine No. 1 and No. 5 to have been taken from the same fracture and from the same point of exposure?

DISCUSSION.

Dr. S. A. Spillman, Ottumwa, Ia.: I regard this as one of the most valuable papers before us, because it tells us some unpleasant things as well as showing that the shadow test for fractured bones is not always reliable, and I think the Doctor has also brought out the fact that simple fractures are not always very simple. I am very much pleased with the paper, and while I cannot say from experience anything about the reliability of this test, I hope it will be fully discussed and I may learn something from the experience of others here to-day.

Dr. G. W. Johnson, Savanna, Ill.: There is one thing I wish to say, and that is, that I would not like to have to defend that case in court. If I could ask a favor it would be that this class of X-ray cases be erased from the railway surgeon's publications. If some patient of that kind should happen to get hold of it he might think it was a pretty good chance for him. When I have a broken leg I have but little deformity, so little it is not apparent and the function of the limb is perfect; I have just as good a leg as I want to take into court, and I will father that kind of a case anywhere.

Dr. Sugg: I have only to say that Dr.

Johnson misquoted me. I said that it would not give me pleasure to take that radiograph to defend a case because the radiograph does not tell the truth. If accepted as infallible it would put me in a very bad position; it would show negligence on my part. That radiograph was a false witness, and it was to that danger I directed attention when the X-ray will be admitted as evidence, and by slight changes in position in taking radiographs various false conditions can be made to appear. If you will examine them you will see whether they are all taken from the same side; that they present various apparent displacements; that I have made it a false witness; that it represents that the fragments were overlapping, while the condition that I referred to was that they do not overlap. That is a permanent callus which has developed; that it represents the true bone and makes things appear as they are now.

I have given considerable attention to the X-ray and worked with it for nearly a year. I admit that I know but very little more now than I did a year ago, but it seems to me very important that by the means of the X-ray we should avail ourselves of the opportunity to take a radiograph of every fracture that occurs. Patients will often be glad to buy them, and even if I get nothing for them, I wish to have them as witnesses in my defense to show the conditions of fractures so that patients can see they are perfectly well and that their fragments have been perfectly united. When you are able to show them that such conditions as they imagine do not exist, you have nothing to fear, whereas, if they don't know the conditions of their fractures they would be ready to go into court and sue you for fractures showing all right all kinds of displacements that you have not the remotest idea exists, and I think it is important for the profession to guard themselves in that way; because I am satisfied that the X-ray will not prove of great benefit to the surgeon without also being a menace and may prove of great trouble in the future.

Fractures of the arm and forearm are often kept too long in splints, and the resulting atrophy from disuse may in the end be far more serious to the patient than a moderate degree of deformity with a sturdy and useful member.—Georg. J. Med. and S.

The U. S. Hospital Train.

A correspondent of the Boston Herald gives the following description of the United States hospital train:

"As the hospital ships Solace and Relief perform a great good for the sick and wounded who are in transit from the field of battle on the ocean, so does the United States hospital train on land. The establishment of a regularly equipped hospital train is an entirely new departure in the time of war, and to our government the entire credit for its existence is due. Heretofore many inconveniences and dangers were met in transferring the wounded from the scenes of conflict, but it can now be done expeditiously and without the risk of aggravating wounds or subjecting the sick to undue excitement or the jostling incident to other forms of conveyance.

"This train is composed of fifteen easy riding cars of Pullman build, very similar to our colonist sleepers. Twelve of these cars are fitted each with thirty berths, washrooms, toilets, compartments for drugs, nurses' rooms, etc. Each car has its own nurses, who are under the direct charge of an assistant to the head surgeon of the outfit. There is also a dining car, with its chef and a corps of assistants, which serves alike to patients, officers and help. In addition to the government rations, there are provided many delicacies by the Ladies' Aid Society of the United States, the head of which is Mrs. Alger, wife of the Secretary of War. This association also supplies quantities of night shirts and underwear for the unfortunate soldiers received into this hospital on wheels.

"Another car is fitted up as a complete operating theater, with its varied assortment of instruments and furniture, and a separate room for the disinfection of the soldiers' clothes. In this car is every appurtenance for an emergency surgical operation en route.

"Then there is a car devoted entirely to supplies, etc., and last, but not least, the rear car is fitted up as a headquarters for the officers and surgeons.

"The train has its own locomotive, runs on a special fast schedule, and is manned by the crews of the various systems over which it runs. The headquarters of the train is at Fort McPherson, Ga., and Port Tampa, Fla., a point of easy access to the government transports. The hospital train is in charge of Major Charles Richards and Captain Stiles, both able surgeons in the United States army."

It seems from this account that the sick and wounded of our army are as well cared for as possible, even under the difficulties of transportation conditions.—Railway Age.

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A NEW DEPARTMENT.

In response to numerous demands for general railway news we commence in this issue the publication of items of news likely to interest railway surgeons. Since the surgical department in The Railway Age was discontinued such news has not been generally accessible, and it is confidently expected the new department will prove both instructive and interesting.

DR. SUGG'S ARTICLE.

The X-ray pictures illustrating the article of Dr. J. F. H. Sugg, in this issue, were taken by the Doctor himself. As will be seen on inspection, they are extremely creditable. Of course, they have lost a little in the reproduction and the originals are clearer.

"THE PRESENT POSITION OF SURGERY."

Mr. Thomas Annandale, the distinguished Scotch surgeon, who delivered the address in surgery at the recent meeting of the British Medical Association, chose for his subject "The Present Position of Surgery." He divided his topic into three heads and considered modern surgery in (1) its scientific aspect, (2) its practical aspect, (3) its moral aspect.

Under the first head he called attention to the fact that when a medical student he had seen wounds dressed with cerates, the arteries tied with heavy silk and the ends of the ligatures left hanging out. As a consequence he had much experience with suppuration, sepsis, hospital gangrene and pyæmia. While acting as a dresser under Syme he learned to use simple water dressings, and dry dressings, and his experience with septic diseases and suppuration was greatly lessened, though too many cases still occurred. As a pupil and colleague of Lord Lister he was enabled to carry out the details of the antiseptic method, since which his experience with these morbid conditions has been reduced to a minimum. In his use of Listerism he discovered that something else was required besides dabbing on of carbolic acid; that application of the principles of rest, avoidance of irritation and attention to the general health were not to be ignored.

Looking into the future, he believes that while bacteriological experiments on animals may aid in some instances, the conditions are not the same.

"I venture to think," he says,* "that much of our future trust for light must be in connection with physiological chemistry, which we hope may be able to teach us more of the origin, causation and behavior of the various toxins and of the actions of the tissues in connection with them, so that we may be able to counteract their injurious effects by appropriate treatment." Mr. Annandale believes much can yet be learned from internal secretions and the physiological connection and interdependence of organs. He believes, also, that much benefit will result from researches on the action of drugs on the various toxins.

* London Lancet, 1898, II, p. 250.

As regards the "practical aspect" of surgery, after forty years' experience as apprentice, student and surgeon, he is of the opinion that perfection has not been attained. He believes, too, that simplicity is the prevailing characteristic of our modern surgery—simplicity both as regards the operation and the instruments, and likewise the after treatment. A caution is suggested against the "furor operativus," for it is pointed out how little risk attends operations at the present time compared to the early part of this century, for example.

From his long experience the author has some strong convictions on the subject of anæsthetics which are of interest. In his opinion chloroform is the best general anæsthetic, and while he has had a few fatal results from its use he has great confidence in it if carefully used and watched. Mr. Annandale believes that deaths will occur, no matter which agent be used, and that these fatal cases may be divided into avoidable and unavoidable. The former include those due to careless administration or neglect to prevent entrance of foreign bodies, such as blood, into the air passages. These are to be guarded against by having one person give the anæsthetic and do nothing else. The unavoidable cases are due to syncope following fatty and other organic heart lesions, and occasionally to cerebral symptoms. The majority of these cases cannot be discovered by examination before the administration of the anæsthetic is begun.

Coming to the moral aspect of modern surgery, our author believes that professional standing is not as high as formerly and not so high as it should be. He attributes this to three causes: 1, overcrowding; 2, untrained specialism; and, 3, what may be called newspaper medicine. In his opinion the increase in the profession is more apparent than real. The active competition is due not so much to an increased number of physicians as to the fact that the large prizes in practice are drawn by a few men, the remainder having to work hard for poor pay. Mr. Annandale thinks that unless specialism is founded on a thorough knowledge of medicine in general as well as of the organ or organs specialized, it is the worst kind of quackery. Under the third head he includes medical advice in newspapers, "household doctors" and similar works, and puffing of one practitioner at afternoon teas while another one is condemned. He believes that the majority of the profession are innocent of any connivance in these social advertisements, while others unfortunately aid and abet them and in conclusion he states:

"If any member of our profession encourages or takes part in society's ignoble life or actions he is not worthy to belong to the profession and he certainly does not add to its reputation."

Translations.

A New Osteoplastic Amputation of the Thigh.

By Dr. A. Jacobson of St. Petersburg.

(Translated for The Railway Surgeon.)

In 1890 Sabaneieff introduced a new osteoplastic operation—an intra-condyloid amputation of the thigh—which has been modified by several operators, notably Koch. This author considers it a very ingenious operation, not only from the standpoint of technique, but on account of providing an easy stump for walking, and has performed it five times in seven months for the following conditions: 1. Sarcoma of the foot. 2. Carcinoma of leg. 3. Tuberculosis of ankle-joint. 4. Trauma of foot and ankle. 5. Large loss of substance in the tibia from a former operation.

The indications for this operation are about the same as those for Gritti's operation. In addition to those just mentioned: 1. Ulcers of the leg incurable by other methods. 2. In large traumas of the leg where the limb cannot be saved. 3. In cases of frost bite and in some cases of gangrene where it is preferable to operate at some distance (diabetic and senile gangrene). Owing to various reasons the operation has been modified from time to time, and I now describe my own modification.

In addition to the usual instruments we will need sharp and blunt pointed knives for resection, raspatories, both straight and curved on the flat, strong hooks with blunt teeth, and instruments for ligating arteries in continuity.

1. CUTANEOUS INCISION.

The patient is placed on the table so the buttocks are at the edge. The sound leg

is flexed on the thigh and the thigh on the body and held there by an assistant. Another assistant is placed outside the thigh and a third holding the foot and leg stands behind the operator. The latter faces the patient, standing inside the right leg and outside the left at the beginning; when the bones are being sawed the operator reverses his position.

Constriction by Esmarch's bandage should not be used.

When the limb is extended we trace a point two finger breadths (or three, if the skin will allow it) below the tuberosity of the tibia. Then holding the limb up two more points are traced on its posterior surface, one at the upper border of the femoral condyles in the middle of the popliteal space, the other a couple of finger breadths above the one in front, and in the middle line also. The two posterior points are connected by a longitudinal incision and from the lower end of this incision another is carried around the limb, forming a raquet-shaped incision (Fig. 1).

1.

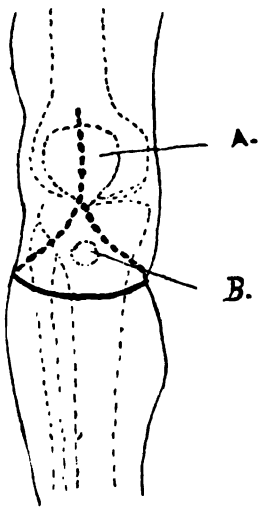

Fig. 1.—Raquet incision.—a. patella. b. tuberosity of the tibia. The dotted line shows the direction of the posterior incision, the continuous line of the anterior incision.

If more economy of skin is desired we may make a circular incision around the leg and add a longitudinal incision in the mid-popliteal space (Fig. 2). In this case the longitudinal incision will be longer than the one in Fig. 1 by two finger breadths. By this method we obtain flaps with right angles. If these angles were rounded off we would have the angles shown in Fig. 1, and the difference between the two represents exactly the amount of skin saved. The raquet incision is recommended by Stephen Smith for disarticulating the knee, and in amputating the leg and thigh, and the circular by Farabeuf in amputating the upper part of the leg by Larrey's method.

II. LIGATURE OF THE VESSELS IN THE POPLITEAL SPACE.

The popliteal artery is tied through a posterior longitudinal incision immediately above its superior articular branches. An oblique or transverse incision through the aponeurosis at the top of the retracted skin should be added to the longitudinal one as Pirogof advises:

2.

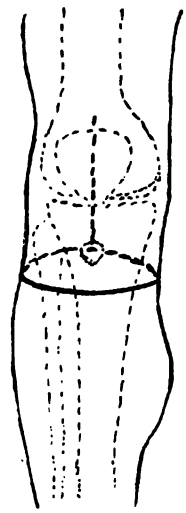

Fig. 2.—Circular incision with the longitudinal continuation.

"It is well to make a transverse subcutaneous incision in the fascia lata at the middle of the wound. This maneuver is of advantage since it lessens the tension of the borders of the wound and contributes to their closure."

Ligation of the artery is evidently much easier in this case than where the circulation must be re-established on account of preserving the limb. Here trying to save vessels and nerves on the way to the artery is useless. The small saphenous vein and the large branches of the great saphenous are seized by forceps and the internal popliteal nerve sev-

ered as high up as possible. The popliteal vein is caught between two forceps and cut. We then separate the artery from the vein, which is much easier than denuding the entire vein, for it is very adherent to the artery. A ligature is placed on its central end. The artery becomes accessible and is tied at two points and cut between the ligatures. The peroneal nerve must now be looked for under the inner border of the biceps tendon, and with its communicating branch should be severed as high up as possible.

III. SECTION OF THE SOFT PARTS.

The operator, aided by an assistant, rotates the limb toward his right hand. The skin and cellular tissue is divided, and at the apex

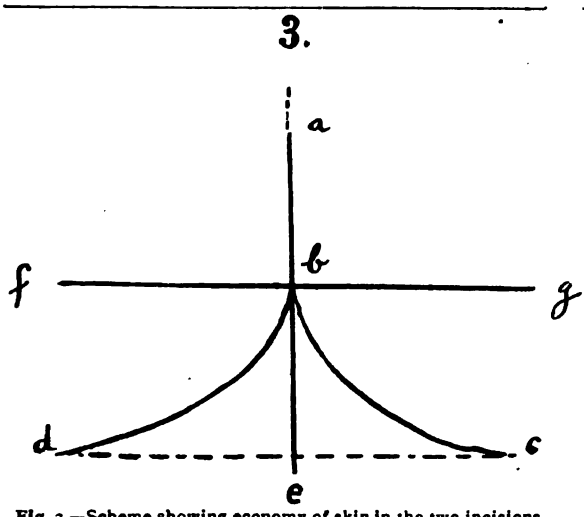

Fig. 3.—Scheme showing economy of skin in the two incisions, f, g, lower limit of the posterior flap in Sabaneieff's original operation; d, b, c, area of skin saved by the circular incision; d. c anterior incision.

of the retracted skin the aponeurosis is divided; also the tibialis anticus and the extensor communis digitorum. On the inner surface are seen the tendons of the muscles forming the pes anserinus, uniting by their expansions with those of the rectus and vastus internus. These tendons are partly detached from their connection with the aponeurcsis and the periosteum, and are then given in charge oi an assistant, who protects them during the rest of the operation by pulling them with a blunt retractor slowly toward the anterior surface of the knee. The periosteum is stripped off above, over the antero-internal surface of the tibia, but the insertion of the tendons referred to is preserved.

IV. INCISION OF THE CAPSULE AND LUXATION OF THE LEG.

The leg being held vertically the two heads of the gactrocnemius are divided, with the fleshy part of the plantaris. Then taking a resection knife the knee-joint is opened by a longitudinal incision; at the same time the popliteus is cut and part of the semi-membranosus. The hamstring tendons are pulled forward and protected by blunt hooks. Then the transverse and crucial ligaments are divided, the lateral ligaments, the remainder of the capsule and the periosteum peeled off the bone, the inter-articular cartilages removed. It may be necessary from time to time to extend the limb so as to discover any remaining points of attachment and divide them.

V. SAWING THE BONES.

The surgeon applies the saw on the articu-

Fig. 4.—The stump with sutures in position viewed in profile.

lar end of the tibia, in its frontal plane, and saws the bone longitudinally, following the lateral incisions of the soft parts as far as the inferior border of the tibial tuberosity. The saw is withdrawn and the leg being placed in its normal position the bone is sawn perpendicularly to its long axis below the tuberosity. The femur is sawn through horizontally and the cut section of the tibia adapted to it.

VI. APPLICATION OF SUTURES.

The tendons being placed in the rear, the cut sections of bones are placed together; the biceps is attached to the tibial fragment. The skin is sutured longitudinally (Fig. 4). There is no occasion for suturing the bones, especially if we use deep sutures, transfixing the periosteum. The rest of the structures are sutured layer by layer.

The inferior surface of the stump will be

represented by the region of the tibial tuberosity, which is a natural point of support, for in kneeling we rest not on the anterior surface of the patella, but on its lower border, the patellar ligament and the tuberosity of the tibia. The longitudinal incision, after cicatrization, heals by a linear scar, hidden in the remaining part of the popliteal space and protected by the tendons forming the lateral walls of this region.—Rev. de Chirurgie. Juin 10, 1898.

Extracts and Abstracts.

Ligatures and Sutures.

By Thomas B. Spence, M. D.

On a question of vital concern to everyone who deals with wounds it would be impossible to say much that is new, but because of this universal interest, it may not be unprofitable to ascertain the present attitude of the surgical world toward a subject which must ever remain of paramount importance and which must, I fear, still be agitated for many years to come. So long as perfection has not been attained attempts will be made to obtain new inventions and to devise simpler and better methods, and since ligatures and sutures cannot yet be said to have reached that state of excellence some improvements are doubtless to be looked for in the future. Many controversies, too, must be anticipated in regard to the minor details, but a great revolution can hardly be expected since nearly every material that can be fashioned into the shape of a cord has been used as a suture or ligature or for the purposes of both.

It is a well-attested fact that the use of ligatures for the control of hæmorrhage was known many hundreds of years before it became a popular method of surgeons. Rufus of Ephesus, who lived during the first century, is said to have been acquainted with their use; Celsus credits an obscure physician of the Alexandrian school with their discovery, and Galen mentions them in his writings. But this simple appliance, which was known at the beginning of the Christian era and which was to figure so prominently in the later history of surgery, was lost by desuetude for fifteen hundred years.

It was not until the middle of the sixteenth century that the ligature was again resorted to, and that was a time when to depart from the ways of the fathers and masters was considered a crime, a time when a change, however valuable it might prove, was thought to be the work of the devil, a time when one's contemporaries bitterly fought progress in any line. Paré may not have been the first to conceive of the ligature, but he had the courage and the fortitude to voice his convictions in this and in other matters and to act them, too, in the face of the strongest opposition. It is pleasing to know that his efforts were appreciated and rewarded during his lifetime, although his colleagues did all in their power to set his work at naught.

While the ligature was very greatly in advance of the cruel and barbarous cautery and is justly considered the beginning of modern surgery, it had some serious defects in the hands of Paré and his followers. Secondary hæmorrhage was the bugbear that haunted the surgeon after every operation, and we of to-day cannot appreciate his pitiable helplessness and anxiety during the after care of his case.

For three hundred years little improvement was made on the method of Paré. He allowed both ends of the ligature to hang out of the wound, but it was afterward found to be of some advantage to cut one end short and thus get rid of nearly half the foreign material.

In 1814 Mr. Lawrence first employed buried ligatures of fine silk and closed his wounds. This method, however, was not accepted and the surgeons of that time continued to use the ligature of Paré. Dr. Physick of Philadelphia was the first to employ animal ligatures made from deer skin, chamois and catgut. McDowell tied the pedicle in his ovariotomy cases and closed the wounds. So also did Nathan Smith in 1829, John Bellinger in 1835, and others after them.

Joseph Lister tried buried ligatures and soon after the date of his first experiments in 1868 the plan of leaving the ends of ligatures long to facilitate their future removal was practically abandoned. He used twisted strips of peritoneum from the small intestines of the ox and fine catgut, both treated with a watery solution of carbolic acid. After ligation of an artery with these the wound was completely closed and it promptly healed. At the post-mortem examination thirty days later only a slender thread of cellular tissue was found at the site of each ligature. Lister remarked: "It appears that by applying a ligature of animal tissue antiseptically upon an artery, whether tightly or gently, we virtually surround it with a ring of living tissue and strengthen the vessel where we obstruct it." Stephen Smith, commenting upon this, said: "To one who has been familiar with the painful anxiety with which the earlier surgeons watched their cases, especially at the period of the separation of the ligature, such language will seem preposterous. But fortunately it is true. We have

reached the happy era of surgery, when to ligate an artery means to strengthen it at the point of ligation. We can ask no more. The improvement in the ligation of arteries reaches its consummation in perfection."

It would be pleasing indeed if this important subject could thus be dismissed forever with words of the most extravagant praise, but the question of asepsis makes it a living issue still. The large number of methods for preparing catgut and the numerous attempts that have been made to substitute other materials for it would seem to prove that perfection has not yet been reached, that there is still a field for investigation. Lister's views in regard to the anatomical changes which are effected by the ligature are probably to some extent erroneous. It is well known that scar tissue is weaker than normal tissue and the fibrous cord which takes the place of the ligated artery is undoubtedly weaker than the artery itself. Be that as it may, the artery remains strong enough to perform its function and, under the ordinary conditions, secondary hæmorrhage is not to be feared. The question is an interesting one, however, since another surgeon has more recently made similar claims for the animal suture.

While many materials have at various times been employed as ligatures, at the present time the choice lies between but two, silk and catgut. They both possess to a high degree the qualities of a perfect ligature, efficiency and safety. Both have tensile strength and a high index of elasticity. Both are pliable and can be easily and securely tied. Both can be sterilized, but silk has the advantage in this particular, as the methods for its preparation are much the simpler. Catgut exerts pressure a sufficient length of time to be efficient, as it is well known that pressure for a few minutes stops bleeding from the smaller vessels and pressure for forty-eight hours at the most is all that is needed to occlude larger vessels, such as the uterine arteries. It certainly can be of no advantage to use material that remains on the vessels for a much greater length of time. Catgut is safe since the tissues readily dispose of it, and herein lies the chief advantage it possesses over silk, which becomes encysted and, if absorbed at all, disappears only after many months. Non-absorbable ligatures frequently come to the surface by ulceration or as part of the contents of abscess formation. Even if they become encysted they may give rise to local irritation and cause pain and discomfort which cannot be relieved except by their removal. The so-called neuralgia of ovarian stumps is undoubtedly an affection frequently traceable to the foreign bodies left in the tissues at the time of operation. As a matter of fact, silk for the ligation of arteries has practically become obsolete except in abdominal surgery, where it is still used by many operators.

Binnie justly remarks: "Why should a distinction be drawn between the adbomen and any other region? In tying the pedicle when removing an ovarian tumor. why should we use thick silk? The reasons are:

"1. It has tensile strength.

"2. Its thickness prevents cuttlng when the necessary force is used.

"But catgut of a thickness sufficient to avoid cutting the tissues when force is used in its application has sufficient tensile strength to withstand the strain of the force applied to it, and if we trust this material in the case of a femoral artery surely we may trust it here also and use it, seeing it has the undoubted advantage of disappearing when once it has served its purpose. It appears to me that the virtues of silk have been unduly exalted. When it is firmly applied round a pedicle the pressure which it exerts must necessarily, within a very short time, cause pressure necrosis and so the included parts be no longer constricted, the silk remaining encapsulated as a foreign body which often gives rise to trouble at a subsequent date."

The truth of these assertions cannot be questioned, and yet many surgeons will say that, while the advantages of catgut are undeniable, there is one disadvantage that offsets them all when the pedicles of abdominal tumors are to be ligated, and that is the difficulty and uncertainty of sterilizing large-sized catgut. Its first preparation by maceration in water is necessarily a dirty process and the gut always becomes impregnated with myriads of germs during the procedure. These germs are often sufficiently protected, when rolled up in the middle of a large cord, to resist all attempts at sterilization. It was with these facts in view that Fowler tried braided catgut ligatures. Small catgut, which can be readily asepticized, is braided to form the heavier strands, and a large experience with these ligatures has shown them to be reliable, safe and in every way satisfactory.

It seems to me that catgut will yet add a little more to its popularity as ligature material and thus witness the downfall of the last of its rivals.

Inquiry into the present status of sutures discloses the fact that this subject is still in its experimental stage. Nearly every operator has changed his views somewhat during the last five years and yet we have hardly come any nearer a common standard.

Material for sutures is sought for from widely different sources and is at present chosen from the mineral, vegetable and animal kingdoms. From the first class silver wire alone is used. Marion Sims made the prediction that the introduction of the silver

suture would prove to be the greatest achievement in the surgery of the nineteenth century. How far short of the prophesied enviable height silver has fallen we are now in a position to observe. Extravagant claims are still made for it by some operators, more especially as a buried suture in the closing of abdominal wounds. The same objections hold here that obtain in the case of non-absorbable ligatures. Foreign bodies which have been left in the tissues will at time cause trouble, either by coming to the surface or by causing pain and discomfort even if they remain buried. Such a suture, by constantly dragging on muscular or aponeurotic structures, will surely bring about atrophy of the tissues inclosed within its bight, and that result shows the permanent suture to be not only useless after a certain length of time, but actually harmful. In surgery of the bones silver wire is still found to be useful, but here also it is in danger of setting up necrosis and is gradually being displaced by its most formidable rival, the absorbable animal suture, which is nearly always as efficient and always safer.

From the vegetable kingdom linen thread is obtained. Its use is rather restricted; just why I do not know. It has most of the good qualities of silk and is much cheaper, but in finer work, such as intestinal surgery, it would be found lacking. As a subcuticular suture it has no equal, since its necessary roughness is a material aid in holding the edges of the skin in coaptation.

Animal sutures may be divided into two classes, the non-absorbable and the absorbable. In the first class are silk, silkworm gut and horsehair. These all have their special uses and the first two at least are practically indispensable to the surgeon.

Silk has always been the favorite material in intestinal work, because the strength of the finer strands renders delicate and at the same time reliable suturing possible. It is also useful in closing wounds of the skin and mucous membrane and makes a satisfactory subcuticular suture.

Silkworm gut is probably the most popular suture material that is at present known. Its great strength, its smoothness, the ease with which it can be sterilized and the slight amount of irritation it causes in the tissues, all combine to make it almost ideal. It has been employed most extensively in the closing of abdominal wounds, and when inserted after the method of Fowler, as a crossed suture, it cannot be surpassed for this purpose. The bringing together in nice apposition of the different layers of the abdominal wall, especially the peritoneal and fascial layers, is considered of the utmost importance. No buried suture can possibly effect this more satisfactorily than the crossed suture, which can be removed at the surgeon's pleasure, while the buried suture must remain in the tissues permanently or become absorbed after a period of time not under control of the surgeon. The crossed suture is also to be recommended in plastic operations on the perineum and in all wounds where deeper layers must be brought together in order to avoid spaces which would allow the collection of exudate. The addition of a subcuticular suture completes a most satisfactory method of closing wounds.

Horsehair has long been in use as a suture material and is to be recommended for superficial wounds where little tension is needed. Its cheapness is a point in its favor and ambulance and dispensary surgeons find it reliable in the minor work that falls to their care.

The absorbable animal sutures have occupied a prominent place in the recent surgical literature and the best known among them are catgut and kangaroo tendon. Marcy was the first to use buried absorbable sutures in 1870 and has been a warm advocate of them since that time. He employed catgut in a herniotomy and was gratified with the result. The difficulties in making catgut sterile and the defects because of the necessary twisting in its manufacture caused him to look about for a safer and more reliable material. After trying various animal tendons he settled upon the tendons from the tail of the kangaroo as the best fitted for the purpose. The preliminary preparation of tendon is a comparatively clean process, while the preparation of catgut depends on the growth of germs. The fibers of tendons are parallel to one another, while those of catgut are twisted to form a cord, and when these twisted fibers become moistened in the wound there is a tendency for them to straighten out again and thus render the pressure faulty and not as the operator had intended.

Ordinary catgut is absorbed too rapidly to be relied upon for closing certain wounds, and for that reason it is often treated with a hardening reagent, chromic acid being most frequently employed. It is difficult or impossible to control the time necessary for absorption and chromic gut often proves irritating in a wound and is the cause of suppuration. It is used extensively in the plastic operations on the vagina and cervix and can certainly be recommended in that work.

Marcy's reports of cases in which kangaroo tendon was used are flattering, but in the hands of many operators, when prepared by Marcy's method of soaking in carbolized oil, the tendon has been far from satisfactory, because it has not been thoroughly asepticized. Boiling in alcohol is a surer means of sterilization, and there seems to be no reason why the bichlorid of mercury method or the formalin method should not meet with equally as good

success here as in the preparation of catgut.

Marcy claims that new connective tissue takes the place of the tendon as it becomes absorbed and that a permanent living suture is thus formed which never ceases to exert an influence toward holding the tissues together. Without doubt such a line of new tissue has been found and perhaps it may always be found if the aid of the miscroscope is invoked; but that it is of sufficient strength to have a lasting value seems to me extremely improbable. I recently had an opportunity of inspecting a refracture of the patella in a case where I had used kangaroo tendon at the first operation, about three months before. Bony union had been complete and the result was most satisfactory, but a diligent search for any trace of the sutures was unrewarded. A microscope might have revealed their track, but microscopic sutures can hardly be expected to find a place in the surgeon's armamentarium.

The absorbable sutures are not suited to closing the wounds of the skin, since the germs in the deeper skin layers are not destroyed by any process of preparation yet invented, and they find a most excellent nidus for their growth and reproduction in the softened animal material.

The so-called living sutures should be mentioned in this connection. These are obtained from the wound itself and have the advantage of being absolutely aseptic without going through a process of sterilization. Ribbons of fascia, or of peritoneum, or the urachus are stripped up and are used to close the different layers of the wound. Whether these strips do remain as living tissue, or are disposed of in the same way as the absorbable animal sutures are, is not known; nor does this point seem to be of great importance, since a careful layer to layer approximation by means of any reliable suture effectually guards against subsequent hernia.

With this somewhat conflicting testimony at hand relative to absorbable and non-absorbable sutures, it would be difficult to arrive at a fair conclusion and to render a just and impartial verdict. Every operator must judge from his own experience, and it seems probable that there will be many and various opinions for years to come. I believe that absorbable sutures should not be used where infection is present or suspected; that absorbable sutures should never be used in the skin; that catgut is not safe if large strands must be used or if a large quantity of any size is needed; that, with the exception of the finest silk, non-absorbable sutures should not be buried; that silkworm gut will continue to be the suture of choice of most of our surgeons and is the most universally applicable material now known.

(To be continued.)

Injuries of the Eyelids and Eyeballs.

By L. Webster Fox, A. M., M. D.

Gentlemen: In all injuries of the eyelids you will find a knowledge of their treatment most valuable in general practice. This class of cases will come under your observation as general practitioners and the proper treatment will frequently enable you to prevent deformities and blindness and mitigate pain.

WOUNDS OF THE EYEBROWS AND EYELIDS.

Injuries of all descriptions should be attentively and cautiously examined in the first instance to ascertain the extent and nature of the injury. In incised, lacerated, or contused wounds the ordinary principles of treatment are applicable; but in incised or lacerated wounds probably greater care must be exercised in uniting the edges of the wounds and in trying to save every particle of tissue. In a measure, this is supplemented by cicatricial tissue, which, in time, produces more or less retraction. This is particularly so in cuts or burns of the eyelids. A case in point was brought to the hospital a short time ago and shown to the class. It was that of a wound of the eyebrow and eyelid, one-third of which, the nasal portion, was detached and torn down through the eyelid. There was considerable retraction of the upper eyelid, though not enough to expose the cornea. The only inconvenience from which the patient suffered was that particles of dust would annoy him at times. His attending physician, who took immediate charge of the case, followed out the theory that here every particle of tissue must be saved, and the subsequent result was good. Had the serrated edges of the wound been trimmed off, the retraction in the end would, no doubt, have been much greater, the cornea would have been exposed, and eventually blindness of the eye might have followed. Where you have simple incised or lacerated wounds of the eyelids without injury to the eyebrow, the cicatricial contraction is not so marked. About one year ago a case was brought to the clinic in which a flying bit of steel had cut the upper eyelid transversely from the outer and upper side to the nasal side, just beyond the punctum lachrymale, the eyeball being untouched by the foreign body. The patient called to see us a short time ago and I found the eyelid in most excellent condition. The slightest contraction was the only evidence of any traumatism.

In the treatment of the wounds of the eyelids, whether the lid is partially or completely severed, accurate union can scarcely be accomplished by means of adhesive plaster. It is better to suture the parts, and this is done by using small, delicate needles with a single

thread. The important part is to bring the edges of the tissue in direct apposition to each other, and to hold them in place by stitches four lines apart. The dressing which we apply is composed of lint saturated and so kept for twenty-four to thirty-six hours with the following lotion:

Recipe: Liq. plumbi subacetatis, 2 drachms. Tinct. opii, Tinct. arnica, of each, 2 drachms. Aq. camph. Aq. destil., of each, q. s. ad 4 ounces. M.

This lotion should be applied cold, and used frequently and the patient must be kept on his back in bed. The suture may be removed in from twelve to twenty-four hours; in that time the edges of the wound will have become fixed so as to remain subsequently in proper apposition. If the sutures are allowed to remain too long, they start up a local inflammation and, later on, these spots will show along the line of the wound, adding somewhat to the unsightly appearance of the cicatrix.

BURNS OF THE CORNEA.

Explosions from various gases cause the highest percentage of losses of vision, either by completely destroying the eyeball or only partially so. Gunpowder explosions probably rank first in the list. Boys, by showing their patriotism on the Fourth of July, through excitement, grow careless, and as a result faces are scorched and eyes burned. I recall a case where several boys were discharging a toy-cannon. The last charge hung fire, one lad went to the cannon and blew into the touch-hole, and the result was an explosion. I was called to see the case and made an examination shortly after the accident. Upon elevating the eyelids I found both eyes more or less sprinkled with grains of powder and the conjunctiva burned. Another case was somewhat similar in character; several boys were making mines and exploding them. In the last one the fuse hung fire. Smith blew on the fuse, and almost instantly the ground was sent flying in every direction, some of the dirt flying into the eyes and face of the boy, causing serious trouble to his vision. Boys are very fond of making experiments with "alarm-cartridges." I have had under my care several serious accidents caused by exploding these cartridges in a reckless manner. Gunpowder explosions constitute only one of a series of accidents which may come under your observation and demand your skill: boiling water, mortar, melted fat, the many acids (particularly sulphuric acid), caustic potash, explosions from kerosene-lamps or from gas, etc. In some of these accidents the cornea may escape and the conjunctiva only receive the injury. I have in mind a case where the conjunctiva was destroyed by quicklime. It first assumed a white, swollen appearance, and in a few days the cornea became infiltrated, and, in spite of the most active treatment, the cornea sloughed and the eye was lost ten days after the accident. In all accidents to the eye if one-sixth of the eye is destroyed then you may give a favorable prognosis; but, if one-third, unfavorable.

A woman presented herself at the clinic two years ago who accidentally received a drop of whitewash in her eye. The hypersecretion of tears washed away most of the lime, yet sufficient remained behind to provoke a serious condition. By placing the patient in bed, keeping on hot pads (which are effective after active inflammation has set in), and instillations of eserine, ¼ grain to 2 drachms, every two hours, the eye was saved, with fairly good vision.

When the cornea is touched by a gas flame, hot iron, curling-irons, or melted lead, the epithelium of the cornea is whitened, coagulated like a layer of albumin, and raised like a blister. This part of the eye is then always sure to desquamate. If the burn has extended into the deeper layers of the cornea we may look for very serious complications and tedious ulcerations, even going on to perforation of the cornea. Staphyloma may develop and the vision be lost. It is astonishing the amount of heat the eye can stand. In the wise dispensation of Providence, Nature has given the eye that power. A person may walk very close to a hot furnace without injury to the eye when the other parts of the face will be scorched.

Caustic potash, when accidentally applied to the eyes, causes pronounced destruction of tissue, and always leaves sad results behind. I can recall a case where a little child accidentally rubbed a certain quantity of potash into both eyes. Her father was a dairyman, and on this occasion had a small open can of this strong alkali standing near some milk-cans, which he used in their cleansing. The child got the alkali, and somehow rubbed this substance into both eyes: enough to produce a very severe inflammation, causing total blindness in one eye and partially so in the other, the eyelids of both eyes becoming attached to the eyeballs. Another case claimed my attention recently where a few drops of vitriol thrown into the eye caused the lower eyelid to become attached to the eyeball.

TREATMENT.

In gunpowder burns of the face and eyes one line of treatment is to try to pick off the grains of powder from the cornea with a spud. This is not always a safe method and you fail to get off all the powder. In your efforts to relieve the patient you make matters worse by irritating the already damaged cornea. When called to see a patient, first wash the face with hot water, using it freely. The water will enter the small openings in the face and dissolve the grains of powder, and the excessive fluid will cleanse the parts thoroughly. After the

face is cleansed attend to the eyes. Keep the lids apart with a speculum and with an eye-douche irrigate the eye-balls. The patient will at first try to evade the full stream by rolling his eyes upward, but in a short time he will roll both eyes downward; while the eye is rolling about take a small pledget of cotton and gently try to remove the powder-grains. The delicate stream of water thrown against the cornea and the brush of cotton places at your disposal the best means of removing foreign bodies from the cornea.

Hard substances, like grains of sand or emery, imbedded in the corneal tissue must be removed with a spud. This playing the water against the eyeball may be kept up, at short intervals of ten minutes, until you feel that you have done all at one sitting that is fairly consistent with the comfort of the patient. Atropine solution (1 grain to 3 drachms) is instilled into both eyes, to put the iris at rest, as corneal irritation produces disturbances of the iris and ciliary bodies. Both eyes are then sealed with sterilized vaselin and eye-pads. In ten to twelve hours the cleansing process may be repeated.

In extensive burns of the conjunctiva and cornea constant application of the following formula (cold or iced) is one of the best:

R Acidi borici. Sodii chlor., of each, 20 grains. Mucilage sassafras med., 2 drachms. Aq. camph. Aq. destil., of each, 2 ounces. M.

It is soothing and cooling to the inflamed parts. Where the cornea is hazy instillations of eserine (¼ grain to 3 drachms) will aid in preserving the cornea. For alkali burns apply any oil, melted tallow, unsalted butter, thick cream, vinegar, sugar, or even molasses—all these simple remedies you will find in every household. Bathe eyes frequently with eye lotion, the formula for which I have just given you. Under all circumstances the patient should be kept in bed and in a darkened room. When the pain is beyond endurance it must be controlled by an opiate. Each and every case of burn must be a law unto itself. Be careful and guarded as to the prognosis of all injuries of this character, as a burn is decidedly treacherous. Immediately after a burn the cornea may give but slight evidence of a morbid change, three days later you may have complete exfoliation of the parts.

I have enumerated but a few of a series of accidents which may come under your observation. I recall a case—an actress belonging to a celebrated company—who was injured by dropping a hot curling-iron upon the eye. When I reached her side I found she was suffering intense pain, which was relieved by a local anæsthetic and ice. The seared epithelium in a short time exfoliated, the denuded corneal surface was soon replaced, and the eyes made a good recovery. The complications which follow such injuries are that we have total ankyloblepharon or partial symblepharon, adhesions of the eyelids or of the eyeballs, or opacities of the cornea. When the eyelid is attached to the cornea or to the cicatricial tissue, the patient is hopelessly blind.

Many of this class suffer much pain in the eyeballs, and it does give relief to separate the eyelids and adjust skin-grafts. An artificial eye may be worn later to improve the deformity. —Medical Bulletin.

Texas Association Railway Surgeons.

Galveston, Tex., August 9.—The fifth annual session of the State Association of Railway Surgeons was held in this city to-day. The meeting was called to order this afternoon at 1:30 in the parlors of the Tremont Hotel by the president, Dr. W. H. Munday, of Terrell. The following were present: M. D. Knox, Hillsboro; J. D. Bedford, Honey Grove; I. P. Gunby, Sherman; W. R. Blailock, McGregor; Clay Johnson, Corsicana; Dr. Johnson, Dallas; L. Ashton, Dallas; Thos. A. Pope, Cameron; Taylor Hudson, Belton, and W. H. Munday, Terrell.

After roll call the minutes of the previous meeting, held in Galveston August 10 last, were read and approved.

The president stated that none of those who had promised papers was present, and consequently there was no regular programme of papers for this afternoon.

Dr. M. D. Knox was called on and responded with a brief paper on "Primary Dressings in Railway Injuries." The paper was discussed by those present, and the means of dressing the wound, the antiseptics preferred, etc., came in for attention.

Several other interesting papers on subjects pertaining to railway surgery were also read.

The following officers were elected for the ensuing year: President, Dr. I. B. Gunby of Sherman; first vice-president, Dr. Thomas A. Pope of Cameron; second vice-president, Dr. J. D. Bedford of Honey Grove; secretary, Dr. Clay Johnson of Corsicana; treasurer, Dr. W. R. Blailock of McGregor.

Corsicana was chosen as the next place of meeting, after which the association adjourned.

Hospital Association for Union Pacific.

The 1,800 employes of the Wyoming division of the Union Pacific are organizing a hospital association to maintain and operate a hospital at Ogden, Utah, and are placing their signatures to a contract agreeing to pay a stipulated amount monthly into a hospital fund and authorizing the Union Pacific to deduct this amount from their salaries.—Railway Age.

Notices and Reviews.

Atlas and Epitome of Operative Surgery. By Dr. Otto Zuckerkandl. Authorized translation from the German. Edited by J. Chalmers DaCosta, M. D. With 24 colored plates and 217 illustrations. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Price, net $3.50.

The series of books forming the Lehmann Medicinische Handatlanten has become quite famous and American students and the profession generally are to be congratulated upon their privilege of securing authorized translations of these valuable works.

As indicated by the title, the subject of operative surgery is presented from a pictorial as well as a descriptive standpoint. The illustrations form a primary feature of the work, while the text serves to present the details of operative procedures and to explain the features of the cuts. The cuts and colored plates are uniformly clear and full of expression, many of them being truly works of art. The more common operations are described and illustrated in a most satisfactory way, and will surely serve as a valuable text for the medical student. The most difficult operations and those not admitting of illustrations are described with great regard for accuracy and precision and cannot help being of interest to even the most skilled surgeon.

One is especially struck with the excellency of the illustrations of operations on the intestines and the cross sections of limbs, while the cuts in the chapter on Amputations are remarkably well selected and satisfactory. The author has very wisely given considerable space to the description and illustration of the use of the catheter, a subject which is so generally neglected in textbooks.

The various operations are considered upon an anatomical basis, those of each region being grouped together.

This small work has so much in its favor that criticism is hardly justifiable, but in subsequent editions we will expect to see the Trendelenburg position properly shown, and to see the old chain saw replaced by the Gigli wire saw, and we believe that Figs. 145 and 146, illustrating resection of the inferior maxilla, should be inverted.

We also note in this work a peculiar condition, but one which is quite common to all surgical textbooks, viz.: While the advantages of the reef and surgeon's knots are extolled, the granny knot is nearly invariably shown in illustrations.

While the illustrations and subject matter of this work is most excellent, we desire to especially commend the work of the editor under whose supervision this most satisfactory translation has been made.

Mr. Saunders deserves great credit for the progressive spirit which he has shown in having this series translated and we bespeak a generous appreciation on the part of the medical profession. A. I. B.

A manual of instruction in the Principles of Prompt Aid to the Injured, by Alvah H. Doty, M. D. Second edition, revised and enlarged. New York, D. Appleton & Co. 1898.,Chicago, E. H. Colegrove.

This work is similar to the one by Dulles and that of Pilcher. The first seven chapters are devoted to elementary physiology, then follow chapters on wounds, fractures, burns, drowning, sunstroke, poisons, etc., with appropriate treatment for each in simple, non-technical language. A good share of the space is devoted to the "litter drill" and transportation of the wounded, which, with the chapter on hygiene, render it particularly valuable for members of the hospital corps and others in the field. L. J. M.

Atlas of Methods of Clinical Investigation, with an epitome of Clinical Diagnosis and of Special Pathology and Treatment of Internal Diseases. By Dr. Christfried Jakob, formerly first assistant in the Medical Clinic at Erlangen. With 182 colored illustrations upon 68 plates, and 64 illustrations in the text. Philadelphia: W. B. Saunders; Chicago; W. T. Keener, 1898. Price, $3.00 net.

This is a most excellent book, and should be in the hands of every student of medicine. It will also be found of value many times in the routine work of all general practitioners, and many whose work is limited to the specialties.

Having thus given the work our unqualified indorsement, it will be sufficient to describe its contents. At least one-half of the volume is made up of colored plates and a concise text description thereof. The plates are almost uniformly clear and remarkably true, both in drawing and color. They illustrate the examination of blood, including blood crystals and blood spectra; the microscopy of the mouth and nasal cavities; the microscopy of the sputum; the contents of the

stomach and intestines; the chemical reactions of the gastric juice, and of the urine, and the microscopy of the urinary sediments. Then follow plates illustrative of the normal projection of the viscera and percutory topography.

The latter half of the volume is devoted to systematic clinical diagnosis, and the volume closes with a very good index.

The author has evidently made excellent use of extensive opportunities for observation, and has given us his results in a most exact and graphic manner.

The mechanical execution of the work is characteristic of Mr. Saunders and is all that could be desired. C. D. W.

Atlas and Abstract of the Diseases of the Larynx, by Dr. L. Grünwald, Philadelphia. W. B. Saunders, Chicago, W. T. Keener, 1898. Price $2.50 net.

This is another number of Lehmann's series of atlases. After an introductory section on the anatomy and physiology of the larynx, the methods of examination are treated of. Next comes Pathology and Treatment, which is illustrated by 32 colored plates of the macroscopic and 13 of the microscopic appearances. All the diseases and new growths affecting the larynx are referred to either in the text or in the plates. Each condition portrayed is accompanied by a short clinical history, thus combining a didactic and clinical course, as it were. The volume will no doubt prove of great value to practitioners, especially those beyond the reach of post-graduate instruction. L. J. M.

Atlas of Legal Medicine, by Dr. E. Von Hoffman, Professor of Legal Medicine and Director of the Medico-Legal Institute at Vienna. 56 plates in colors and 193 illustrations in black. Philadelphia: W. B. Saunders; Chicago: W. T. Keener, 1898. Price, $3.50 net.

The reviewer, who has had considerable experience in medico-legal work, believes this volume to be the most valuable one in the series for the practitioner in the country, or at a distance from medical centers. The country practitioner is liable to be called on for medico-legal testimony, or to perform a necropsy at a moment's notice, and perusal of this work would save many ridiculous and even lamentable errors. The writer knows of a worthy M. D. who testified a man had been shot because he found a round hole in the body. No further examination was made, and of course his evidence was ruled out, whereupon he became highly indignant.

It is relatively easy to investigate cases of death where the cause is evident, such as a stab or shot wound, but much skill is demanded where a person dies from natural causes but under suspicious circumstances.

While all the illustrations are remarkably true to nature, special attention may be directed to the ones showing the effects of poisoning by arsenic and by carbolic acid, which leave nothing to be desired from the standpoint of accuracy.

The work is designed to accompany treatises on legal medicine, and besides the effects of various poisons we find figured: Hermaphroditism, defloration, abortion, head injuries, effects of blunt and sharp instruments, gunshot wounds, suffocation, putrefaction, etc.

It will prove a very good investment for any physician. L. J. M.

PAMPHLETS RECEIVED.

"Cataract Operations; Mule's Operations; Capsulotomy; Operation for Pterygium." By L. Webster Fox, M. A., M. D., of Philadelphia.

"New Forceps for Intestinal Anastomosis." By Ernest Laplace, M. D., LL.D., of Philadelphia.

"The Diagnosis and Differential Diagnosis of Pulmonary Abscess and Gangrene, with View to Surgical Treatment." By Robert H. Babcock, A. M., M. D., of Chicago.

Personal.

Dr. W. S. Caldwell of Freeport, Ill., has removed to Sioux Falls, S. Dak.

Dr. E. W. Lee has been elected second vice-president of the Omaha Medical Society.

Sir William Hingston of Montreal has received the degree of LL.D. from the Ottawa University.

Dr. W. P. Lawrence, surgeon of the Plant system of railroads at Tampa, Fla., is at Santiago with the troops.

Dr. W. D. Middleton, chief surgeon of the Rock Island road, was elected president of the Scott County Medical Society recently.

The Earl of Aberdeen and Lord Strathcona and Mountroyal have been made honorary members of the British Medical Association.

Prof. T. G. Roddick of Montreal, who presided over the meeting of the British Medical Association, has been made a vice-president for life.

Railway Miscellany.

(Railway surgeons are, or should be, interested in all that belongs to railroading, as well as in their own immediate work. In response to a desire which seems to be general among our readers, this department, being a summary of the railway news of two weeks, has been established. Credit is given for most of the matter contained herein to the Railway Age.)

Obituary.

John Nesbitt, general live stock agent of the Chicago & Alton at St. Louis, Mo., died in that city August 9 of neuralgia of the heart.

J. W. Hicks, traveling passenger agent of the Nashville Chattanooga & St. Louis at Atlanta, died at his home at Yellow Creek, Ga., August 8.

Isidor Bush, at one time general passenger agent and auditor of the Iron Mountain Railroad, died at St. Louis, Mo., August 5, at the age of 76 years.

P. H. Wyckoff, general freight agent of the Central of New Jersey, died at his home in Elizabeth, N. J., August 9. He was about 60 years of age and had been connected with the road for thirty years.

Edward Appleton, one of the first railroad commissioners of Massachusetts, died near Boston, August 1, at the age of 82 years. He constructed railroads in Maine, New Hampshire, Massachusetts, New York, Pennsylvania, Ohio and Wisconsin.

Andrew Nicol of Green Ridge, Pa., for many years superintendent of the mines of the Delaware & Hudson Canal Company, died August 6, at the age of 81 years. He entered the service of the company in 1851 and was placed on the retired list Jan. 1, 1897.

Charles E. Simmons, formerly land commissioner of the Chicago & Northwestern, which position he resigned July 1, 1897, on account of ill health, died at Oak Park, Ill., August 9, at the age of 52 years. He became connected with the land department of the Chicago & Northwestern in 1876, and was appointed land commissioner in 1878.

A. F. Dunlevey, auditor of disbursements of the Baltimore & Ohio, died suddenly at his residence in Baltimore, July 26, at the age of 69 years. He was born in Baltimore and entered the service of the Baltimore & Ohio in 1862 as clerk in the general offices, which position he held for eight years. From 1880 to 1882 he was chief clerk in the service of the Indianapolis, Decatur & Springfield, and during the latter year returned to the Baltimore & Ohio as chief clerk of the auditor's office. He was appointed auditor of disbursements in October, 1884.

A Good Locomotive Performance.

We have just received the record of an excellent locomotive performance on the Soo Line, being a 500-mile run of engine No. 500, from Minneapolis to Sault Ste. Marie, June 15, 1898. The record is good as regards the average of speed maintained, and especially so when the amount of coal consumed is taken into consideration. The figures are as follows:

	Miles.	Cars.	Weight of Train.
Minneapolis to Weyerhaeuser	120	9	381 tons.
Weyerhaeuser to Pennington	113	8	349 tons.
Pennington to Manistique	160	9	381 tons.
Manistique to Sault Ste. Marie	107	10	431 tons.
Average weight of train entire distance			381 tons.
Pounds of coal consumed per train mile			54.6.
Coal consumed			13.1312 tons.

RATE OF SPEED.

	Lowest.	Highest.	Average.
Minneapolis to Weyerhaeuser	30	47	37
Weyerhaeuser to Pennington	32	45	36
Pennington to Manistique	30	48	39
Manistique to Sault Ste, Marie	32	47	39

Actual average speed of train while in motion, 37.82 miles per hour.

Total distance run, 500.3 miles.

Locomotive Boiler Explosions.

One more has been added to the long list of mysterious locomotive explosions. On Friday, July 22, at 4:30 a. m., the engine attached to a Central Pacific freight train exploded while running at a speed of ten miles an hour through the town of Dutch Flat, Cal. The engine, a large compound, had recently gone through the shops and been thoroughly tested. Press reports say: "Along the track at this place and close to it are a number of buildings, the first being a general store, then a freight and ticket office and last of all a small hotel and saloon. As freight trains pass through Dutch Flat without stopping, everyone in the little town, even the ticket agent, was asleep when this train swung around the curve. Suddenly, when the head engine arrived at a point directly alongside the hotel, there was an explosion, the noise of which was terrific. An immense cloud of steam rolled skyward. There was a sound of falling iron and the roof of the hotel rose in the air and fell back, crushing the walls of the building. At the instant of the explosion the air connections of the engine were ruptured and the train was brought to a standstill. The concussion made by the bursting boiler aroused everyone in the sleeping town, and a number of citizens were on hand almost as soon as the trainmen, who came running from the caboose at the rear. Here in the early light of the morning was depicted a distressing scene. Where a few moments before had stood engine 1993 there was now a mass of tangled and twisted iron work. The sides of the hotel a dozen feet distant looked as though they had been fired at with cannon, and out from the building came cries for help." It is stated that three

people were killed (including the engineer and fireman) and four injured by the explosion.

An Engineer's Testimony.

The New Albany (Ind.) Ledger says: "In his testimony at the coroner's inquest over the remains of Engineer William J. Cearns, killed in the collision on the Air Line near Georgetown on Monday evening, Engineer D. Wykoff, of the freight engine, assumed the responsibility of the accident. He said that when his tender left the track he thought he could speedily replace it and be out of the way of all trains, but he delayed too long in flagging his engine. He says he started down the track to flag Engineer Cearns' train, when he saw it coming around the curve, too late to flag and stop it and prevent the collision that came a moment later, as the passenger train was running at too high a rate of speed to be stopped by the air brakes, which Engineer Cearns turned to. Mr. Wykoff has the reputation of being a first-class engineer and a first-class citizen, and is deeply grieved at the fatal accident that lost the life of a brother engineer and a warm friend. His manliness in assuming the responsibility for the accident shows Mr. Wykoff to be a true man and one of integrity."

The Decline in Freight Rates.

William Jennings Bryan, in the campaign of 1896, declared in one of his public speeches that there had been no reduction in railway rates commensurate with the decline in the prices of other commodities. The statement was immediately challenged and shown to be untruthful. It is, however always more easy to start a falsehood on its travels than it is to catch up with and confute it, and, although the evidence produced against Mr. Bryan was overwhelming, it is probable that a great many thousands of people who heard or read the original declaration never heard or read the contradictions—or, if they heard or read them, they did not believe them. All railway men and all lovers of justice regretted at that time that the facts on the subject were not so notorious as to make such a misrepresentation as that of Mr. Bryan impossible.

Some months ago the Railway News Bureau of Chicago issued a leaflet on the subject, giving extracts from all accessible authorities showing what the decline in railway rates had been. An even more valuable document has now been issued by the United States Department of Agriculture, the matter having been prepared by Mr. H. T. Newcomb of that department. The facts set forth by Mr. Newcomb do not differ from those of former authorities; but they are more valuable as being in the form of an official publication of a department of the United States government. Briefly, the decline in rates per ton per mile is shown to have been as follows:

1867	1.925	1882	1.102
1868	1.810	1883	1.205
1869	1.709	1884	1.136
1870	1.889	1885	1.011
1871	1.789	1886	.999
1872	1.846	1887	.984
1873	1.613	1888	.941
1874	1.520	1889	.922
1875	1.421	1890	.941
1876	1.217	1891	.895
1877	1.286	1892	.898
1878	1.296	1893	.878
1879	1.153	1894	.860
1880	1.232	1895	.839
1881	1.188	1896	.806

The decline in thirty years. therefore, has been from about 2 cents to 8 mills, or a fall of 58 per cent. Even this does not represent the whole of the actual decline, because for the earlier years the records are incomplete and the roads on which the rates are now ascertainable are those which with the least business had the highest rates. The real average for the country in those days was undoubtedly even higher than the figures indicate. Taking the figures as they are, however, the report says that the decrease "is probably not exceeded by that in the price of any important commodity among those largely shipped by rail." This is the exact opposite of Mr. Bryan's assertion, and while Mr. Bryan was only guessing for political effect, the other statement is official and backed by figures which are unchallengable.

Ticket Stamp Forgeries.

It may be superfluous to multiply evidences of the inherently dishonest nature of the scalper's business, but where there is deliberate forgery of one signature and of two stamps (one of which is an official seal) on a certain class of ticket, and when all three of the forgeries are being systematically used on a large number of tickets of that class, the incident becomes slightly out of the common. The following circular of Mr. F. C. Donald, commissioner of the Central Passenger Association, explains itself:

"Tests of the offices of ticket brokers disclosed the fact that the signature stamp of the undersigned, the official stamp of this association, and the perforating stamp used in validating the return portion of round-trip tickets sold account of the meeting here July 13-20 of the Young People's Union of the Universalist Church, have been forged, and are being used in the fraudulent execution of expired tickets sold by the brokers. Under the con-

tract conditions of tickets sold for the above meeting, the open return limit expired July 21, and only such tickets are available for return passage as are on deposit in this office. Our investigation indicates that the brokers have on hand a considerable quantity of this dead stock which they cannot galvanize into life by means of the forged stamps. To prevent the further manipulation of these tickets, we have to suggest that you issue bulletin notices to your gatemen and conductors outlawing all special tickets of your issue or reading via your line sold on account of the Young People's Christian Union of the Universalist Church, which may be presented for passage after midnight of this date, and instruct your depot or city ticket agent, as you may prefer, to issue in exchange for tickets which we have on deposit, and only upon our written request, train tickets to the destination of the original ticket."

The Brown System of Discipline.

The Pittsburg, Bessemer & Lake Erie announces its adoption of the system of discipline without suspension as follows:

NOTICE.

Pittsburg, Pa., Aug. 3, 1898.

All Employes of Operating Department:

On Aug. 15, 1898, the system of "discipline by record" for employes will be put into effect, and suspension from duty, with consequent loss of time, will be discontinued.

With a view of accomplishing this, a record will be kept of each employe, in a book for that purpose, in the office of the superintendent of transportation. A duplicate record may be kept in the office of the master mechanic of all employed in the mechanical department.

This record will show concerning each employe, his shortcomings, neglect of duty, violation of rules, all bad conduct, etc., and at the same time a similar record of commendable service, economical performance, excellent conduct, valuable suggestions, and all exceptionally good acts which assist in establishing the record of the first-class, conscientious employe.

Employes will, as heretofore, be discharged for drunkenness (either on or off duty), for drinking intoxicating liquors on duty, for frequenting saloons or other places of low resort, for incompetency, dishonesty and insubordination, and for other serious offenses.

One demerit mark will be assessed in each case representing one day's suspension under the former system, excepting that for a repetition of the same offense additional demerit marks may be assessed.

This record book will be available during office hours in the offices of the heads of departments mentioned above, and any employe shall be entitled to examine his own record whenever he desires, but, under no consideration, to examine the record of any other employe.

Each person will be entitled to 60 demerit marks before dismissal. A perfect record for six months will entitle the employe to a cancelation of 10 demerit marks; a perfect record for nine months will entitle him to a cancelation of not exceeding 20 demerit marks; a perfect record for one year will entitle him to a cancelation of 30 demerit marks. No credit will be allowed for less than six consecutive months' service.

Advisory bulletins will be posted from time to time as necessity may dictate, showing the action taken with parties at fault, for accidents, neglect of duty, etc., omitting the names of the offenders and any other means by which they might be identified by their fellow employes.

The above named bulletins will also show what action might and should have been taken by that employe which would have enabled him to show his interest in the affairs of the company, and his ability to employ the best methods in emergencies.

The objects expected to be obtained under this new system are:

First. To avoid loss of time to employes and consequent possible hardships upon those who may be dependent upon their earnings.

Second. That all may become acquainted with every case for which discipline is imposed, and learn something from the failure of others.

Third. To encourage and stimulate all employes to co-operate with the officers in all matters tending to produce efficiency and thereby secure better service.

By adopting this method, we hope to encourage good men; improve the service of fairly good employes, and drop from the rolls any employe who may be habitually careless and indifferent to the company's best interests.

All parties affected by this notice start with a clear record on the date above mentioned, save where the future record of parties concerned shall show that past offenses are being repeated, and that former consideration for the offender has not brought about the desired result.

It is not the intention by this change to relax discipline, but to enforce more fully the performance of existing rules, and it is believed that this system will receive the intelligent appreciation of the employes of this company, and that it will be beneficial to, and meet with the hearty co-operation of all concerned.

F. E. HOUSE,
General Supt.

Approved:
J. T. ODELL, Vice-President.

THE Railway Surgeon

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THE SURGEON IN COURT.

AN ADDRESS BY B. B. OSLER, ESQ., Q. C., TORONTO, CANADA,

Counsel Grand Trunk Railway.

Mr. President and Members of the International Association Railway Surgeons: My friend, Mr. Bell, General Counsel of the Grand Trunk Railway, was assigned to this duty, but owing to his engagement it has fallen on my shoulders as one of the counsel of the Grand Trunk Railway to say a word or two of welcome and to give you a short address. As far as the Grand Trunk, and I think I may say the Canadian Pacific, are concerned, while they heartily appreciate the railway surgeons and their association, they desire to have as little for them to do as possible. (Laughter.) You, gentlemen, represent the mistakes in the operative departments of the railway and your services are only called for when a calamity has shown the result of error. Nevertheless, I am afraid you are with us always.

I propose to make you a short and somewhat informal address upon the surgeon in court. It is a subject I am somewhat familiar with, and upon which I may be able to put together some ideas that may be of use to some of your junior members. In the large majority of cases connected with railway work the corporations are in the hands of both the surgeon and the counsel. But I have often thought what advantage the counsel has over the doctor. The counsel is paid his fee and is expected to show his bias, and he can show it not under oath; while the surgeon is paid his fee or his salary, and he is expected not to show his bias and to conceal it under oath. (Laughter.) It is a difficult task for the surgeon. He has at the foundation honesty and professional propriety, and yet he is the retained professional adviser of the railway company in whose hands their interest is placed. Consider his position; he has to be ready for cross-examination at the hands sometimes of counsel who, perhaps, has studied more law and facts than ethics. (Laughter.) He has to meet the claimant's lawyer and the claimant's physician. It is one of the hardest positions a physician can occupy, and I have seen doctors on some occasions when they wished themselves in the vilest sick room they were ever in rather than to be in the atmosphere of the court rooms. The situation is one of the great difficulties that has presented itself from the beginning, and in contested cases probably will present itself for all time.

The railway surgeon has to bear in mind that there is some difference between his duty to the sick or maimed man that has been under him and that to any ordinary patient; and this arises from the fact that he has not been called in by the sick man or by his relatives, but he has been sent to see the man as the railway surgeon paid by the corporation. There is what the lawyers would call no privacy between the patient and doctor. He owes two loyalties, one to the patient, and one to the corporation. If he owed it only to the patient, there are many things he ought not to tell. But he reports all he sees and knows with reference to the patient, and which are pertinent to any claim hereafter made, and it is no breach of professional etiquette or propriety. It might be a breach of etiquette if the physician had been called in by the man or by his friends, but being there in the pay of the corporation, as long as his friends chose to leave the patient there, the retainer is that of the corporation, and he is at liberty to give information which it would be improper to give if he was there only in the interests of the patient.

This is one of the important matters which

concerns the physician in court. We have not here any statute making the relationship of physician and patient a privileged one. There was such a statute in the state of New York, and in some other states, but I think those statutes have been repealed. You are, of course, in court giving testimony; you have to consider that the privilege which ethics demand does not exist. You are bound to answer all questions with relation to the sufferer, with relation to the claim, and this relieves you, perhaps, on occasions, of one of your difficulties. Sometimes you hesitate in speaking of a patient and you only speak when the court rules. The courts of this province have decided that where the company engages the surgeon, he is entitled to all the information that that relationship gives.

The question of expert testimony in conflict in all surgical cases is one which passes as a current joke with the newspapers. In my experience the difficulty is being greatly removed. There is no better way yet devised for getting at the truth than by cross-examination and by placing the opposing experts in the box. It has been thought that medical experts should be appointed in each case by the court. To some extent we do that in this province, but not to a very great extent. If a claimant refuses to be examined as to his physical injuries for which he is claiming, our courts make an order that he is to be examined by the physician named by the court, not subpœaned by either party, and that physician has to make a report to both parties of the condition which he finds. But he can be called by either side as a medical expert after he has made his report. To complete the law on the road which that statute commenced to travel, the expert's report ought to be received as a finality by the court and so end all medical controversy; but I do not think that would be a better way of getting at the truth than the one we have now. It would be infinitely more pleasant for the medical profession; it would save all cross-examination, but the object of cross-examination is to get at the truth. There are a hundred men who could make a report, and there may be only ten of them who could stand a cross-examination on that report, and I think our duty to the present system is to uphold it and try to better it—try to eliminate that which has on occasions made a bad appearance to the public.

Now, let me suggest how that may be done. In the first place, any doctor who goes into the box to testify must remember that he has counsel on the other side who has crammed himself for the occasion, who, perhaps, has in his own mind as many details connected with the surroundings of the accident—I mean physical surroundings—as have presented themselves to the mind of the doctor, and he is cross-examined upon them, and apparently in some cases the lawyer knows more than the doctor does of his own science. The first duty, I would submit, of the physician going into the box is to freshen himself upon the subject he is going to be cross-examined upon. In the next place, his duty should be to have courage enough now and then to say, "I don't know." (Applause.) It does him no harm; in fact, it does him a great deal of good to say "I don't know," for, let me tell you, that the man who has the courage to say "I don't know," is more apt to be believed as to what he says than one who says carelessly he does know. (Applause.)

The scandal, if I may so term it, of opposing expert testimony in the medical profession is being diminished year by year. The result of a higher sense of professional responsibility. We are getting every year a higher tone, largely from the influence of medical associations. When a man finds that he cannot be admitted to a county, a state, or provincial medical association, he wants to know why. A young, energetic doctor, who goes into the box on part of a claimant, is much more careful in his evidence when he sees seniors, whom he honors and respects, sitting in the court room. Why? Because he wants the good opinion of those whose opinion is of value. I have found in many accident cases no necessity for calling a railway surgeon as an expert because I have found the claimant's experts were so moderate and reasonable in their statement of the damages sustained that there was not the slightest need of calling for medical testimony to meet it. This is happening now every day. It is immensely to the credit of the medical profession that the difficulties I have alluded

to are being overcome by themselves. There is no more difficult situation than the one that I have alluded to, and it is being steadily overcome by the better tone, by the better standing of the medical profession as a whole.

Gentlemen, there is not much more for me to say. I can't tell you anything about your profession; I can only talk to you where the two professions come in touch. I can only give you the result of my experience. There is a class of cases peculiarly interesting to both counsel and railway surgeons, those known as railway spine or traumatic hysteria. It is a constant source of trouble to the railway lawyer, the railway surgeon, and often to the railway exchequer. Along the backbone, well protected as it is on both sides, hangs all sorts of fraud. Along the backbone most fraudulent cases are located, and many a man has picked himself up from a minor accident and said, "Thank God, there is large money in sight now," and instead of going home to saw wood, as he ought to have done, he has gone to bed, sent for a lawyer and a young doctor and worked out the way to a fortune by the great spinal route. (Laughter.)

There are undoubtedly cases of genuine injury of this sort which ruin men for life. I have in mind two cases where permanent injury has remained as the result apparently of a trifling accident. But I have in mind about a dozen cases where the trouble remained until the motion against the verdict was denied. then there was prompt recovery. Nearly all the symptoms being subjective, makes fraud easy. The only suggestion my experience would lead me to make is this: The longer the trials are deferred, the better for the railway company. Early examination by the lawyer, when the claimant is bound to state all he feels and knows about himself and how the accident happened, is very important. Very often, early in the litigation, the claimant has not read up the symptoms, or posted himself on them. Early examination is, therefore, of the greatest importance. Early medical examination is of great importance, to be followed by one near the trial, so that we may have the comparative results. These are the only suggestions I have to make in the class of cases that troubles you and counsel more than any other. While there are honest claims for injuries sustained during accidents, there are others in which, if the men suffering could throw the claim off their minds, they would recover without any aid from a physician.

There is one other matter I desire to touch upon very briefly. The railway surgeon, especially he of the junior order, is sometimes more or less of a claims agent of the railway company. You ought never to act in that capacity. You ought never to attempt a settlement for the company. That is none of the railway surgeon's business. (Applause.) It is often convenient for the railway company to have him give advice in the matter. But he has a duty to perform to the man who is before him, although he is the railway surgeon. The man is very helpless, perhaps, is largely in his hands, looking to him for physical aid and comfort. Your relationship to the railway companies is such, that although you are agents of the railways, there should be no claims agent in your profession. Settlements made by the surgeon are looked upon with the greatest suspicion by the courts, and are very often set aside to the great discredit of the physician who has brought it about.

Now, gentlemen, strangers in the city of Toronto, I extend to you a hearty welcome as far as the profession represented by myself is concerned. We are delighted to have you visit us. We hope you have come not spy out the land, but to see it, and remember, we are your neighbors in the highest sense of the term if you wil have it so. (Loud applause.)

TRANSFUSION.*

By S. R. Miller, M. D., Knoxville, Tenn.

Few subjects of such vital importance are receiving so little attention in our medical journals and societies at present as that of transfusion. That it is one of our most valuable therapeutic resources I think none will doubt. When needed, it is needed most of all. It must be procured quickly and can be replaced by nothing. Not only is transfusion neglected by writers, but it is neglected by the practitioner. This, I believe, is due

*Read before the sixty-fifth annual session of the State Medical Society of Tennessee, April 13, '98.

largely to a lack of knowledge of the simplicity of the operation, and the certain results that may be expected to follow it when properly performed.

The transfusion of to-day is not the transfusion of a century ago; yea, not the transfusion of only a few years ago. It was first introduced by Sir E. King and Dr. Lower of Oxford, about half a century after Harvey's discovery of the circulation of the blood. They used the direct method-transmitting arterial blood into venous channels. They knew little of the blood and its complex character, and believed the blood of every species to be of equal value when transfused. They met with some success, but the mortality was so great that the operation was soon abandoned. It was revived about a century later by Dr. James Blundell. He, with other experimenters, proved that the blood of one species could not be used with success in another species, i. e., man should be transfused only with the blood of man. He also saw the inexpediency of opening an artery and drew his blood from the venous channels instead. The force of the venous blood was not sufficient to propel itself through the tube used in the direct method and the indirect method was used instead.

This led also to the introduction of various instruments, some simple and inexpensive, others more expensive and complex. The formation of clot seemed to be the great difficulty, and even the most skilled surgeons could prevent it in no great number of successive cases. A solution of carbonate of ammonia was used to overcome this difficulty, but without any marked success. Defibrinated blood was used, but the mortality was yet too great. Each method used proved unsatisfactory, not so much for its impracticability or failure to produce immediate effect, but on account of the ultimate mortality following its use.

The blood is the life of a man. The red corpuscle is the life of the blood. These facts were known to tne early experimenters, and they believed it to be necessary to supply the patient with the red blood corpuscle to obtain the desired results. The chief value of the red corpuscle is due to its hæmoglobin, which receives oxygen in the lungs and carries it to the venous tissues, but death does not occur in hæmorrhage from failure of the body to get oxygen. Death occurs from heart failure owing to one of two causes, viz: the action or rather the failure of action of the central nervous system on account of anæmia, or the failure of the blood to reach the heart in sufficient quantity to stimulate contraction. The latter is the usual cause.

To supply the heart the circulation must be maintained, and this cannot be done without sufficient pressure. Pressure is necessary so that the reaction of the elastic walls of the arteries will force the blood through the capillaries during the intervals of the heart's action, and supply the venous current with a vis-a-tergo force to drive it to the heart. In gradual loss of blood the arteries, capillaries and veins are often contracted to meet the demand, but in sudden hæmorrhages they are not sufficiently contracted, but often relaxed and dilated.

In decapitation it has been proven that a considerable amount of blood remains in the body, and more remains when hæmorrhage occurs from a smaller artery, or through a wound that forms some obstruction. If life can be prolonged after slow hæmorrhage, and after wasting diseases, where the blood is greatly reduced, why can we not, with the large quantity remaining in the system after severe hæmorrhage, save life by diluting this blood sufficiently to fill the circulating channels? Transfusion with aseptic normal saline solution seems to meet the requirements. It is simple and accurate. It requires no expensive or complex instruments, and is practicable in almost any household. The technique is simple and requires no special surgical skill or anatomical knowledge.

Any prominent vein may be chosen for the operation. If a large vein is exposed in an open wound, it may be used. The point of election is the median cephalic, just at the bend of the elbow, and external to the tendon of the biceps. The reason for choosing this vein rather than the median basilic, which is often more prominent, is its simple anatomical relation. The artery lies just behind the latter, while the internal cutaneous nerve passes in front of it.

There are two cardinal points to be observed in transfusion. Through asepsis and the exclusion of all air from the vein. A

knife and small tissue forceps, two strands of thread (silk is preferred), a canula, and an apparatus for conducting the fluid to the vein, are all that is required. The apparatus to be preferred is the glass irrigator, but that which is more convenient for the general practitioner's use is the fountain syringe. An apparatus that answers the purpose well is a small rubber tube attached to an ordinary funnel. In a word, anything that can be made aseptic and will conduct the solution and exclude the air.

The normal saline solution resembles closely the plasma of the blood. This is 6 per cent. sodium chloride (common salt). The salt may be had in any household, and a teaspoonful to the pint of water will make the approximate strength. The solution may be made aseptic by placing it in a clean covered vessel and boiling gently for fifteen minutes, and then cooling to the proper temperature by external means before removing the cover.

Instruments, apparatus, the hands and field of operation should be made thoroughly aseptic if the time will permit. The vein should be made prominent by proximal occlusion and then exposed. Two strands of silk may be passed behind the vein. It is then opened and the canula filled with the solution is introduced. The distal end of the vein may then be tied off, and the canula gently tied if necessary in the proximal portion. The solution is first allowed to run through the tube and canula to free them from air and cold solution, and while it is flowing connect the canula with the vein. See that the end of the canula does not press against the wall, but is in the channel of the vein. The temperature of the solution is not essential, provided it is above the body temperature. To combat shock and to secure the best benefit, it should be 115 to 120 degrees F. (about as hot as the hand can bear for half a minute). The quantity required will depend largely upon the case. If hæmorrhage has entirely ceased, the pulse will be a good guide. The solution should be introduced slowly. From two to four pints is the quantity usually necessary, though where very great hæmorrhage has taken place more may be required. The wound is closed with an antiseptic compress and bandage, and usually heals very rapidly.

All oozing and hæmorrhage from small arterioles should, if practicable, be entirely checked before this operation is done. It must be remembered that the blood's power of coagulation is reduced in proportion to the amount of solution used. This should receive special care when the hæmorrhage takes place into one of the cavities. Precaution must be taken also not to overpower the heart by the use of too much solution. Excessive diaphoresis frequently follows the operation. I cannot see that the intra-arterial transfusion possesses any advantages over the intravenous method, and it makes a more serious wound and possibly requires more skill.

Subcutaneous injection is another method of securing the same results; this is efficient but is slower in its effect. The saline solution is thrown into the cellular tissue beneath the skin, from which it finds its way into the circulation. The operation is quite simple; all that is necessary is a fountain or bulb syringe and a long aspirator needle. Any part of the body supplied with cellular tissue may be selected for this operation; I prefer the loin. The needle is inserted its full length, and as the cellular spaces fill the needle is withdrawn, before it is completely withdrawn it may be reintroduced in another direction from the first, and again in another until all of the cellular tissues is filled. In this way only one skin wound is made.

A slower, but simpler method, is the injection of the solution into the rectum. Any syringe may be used for this purpose. If much solution is required, it should be introduced slowly, and if the conditions will permit, the patient may be placed upon the left side, as in this position the solution will find its way higher in the canal. The introduction of saline solution into the peritoneal cavity has been practiced with much success. This is very convenient following abdominal operations—the fluid being introduced just before the closure of the wound.

Normal saline solution is absorbed readily by the peritoneum and has proven absolutely unirritating. The same cannot be said of distilled water. For each of the methods described the normal saline solution possesses decided advantage over distilled water. The latter produces certain microscopic changes in the blood corpuscles and impairs their vitality. This appears to be due to a difference in the

osmotic properties between the water without and the protoplasm within the cell. The normal saline solution is simply an imitation of the blood plasma. Not only does the salt preserve the function of the animal cell, but it increases the endosmotic power of the fluid. This is an important quality if the fluid be thrown into the cellular tissue, rectum or peritoneal cavity.

We, therefore, deduce the following conclusions:

Intravenous transfusion is quickest and most accurate. It requires more skill than the other methods and more attention to the details of asepsis than the subcutaneous injection or enema. It is to be preferred where there is immediate demand and the necessary preparation is made. It combats shock best. It is perhaps most useful in very bloody operations where the necessary loss of blood would prove fatal before the operation could be completed.

2. The subcutaneous method is slower and requires less preparation and skill than the intravenous method. It does not depend so largely upon asepsis. It should be employed where the intravenous method is not practicable.

3. Injection into the peritoneal cavity should be employed only in operations involving that cavity. Absolute asepsis is demanded here. It is probable also that this prevents to a small degree adhesion of the raw surfaces.

4. The rectal injections are easiest and quickest of application. I prefer this method to avoid rather than combat shock. It serves best where there is least shock.

5. The general surgeon should not allow himself to become "wedded" to either method, but be thoroughly acquainted with each and then employ the one that in his judgment is best suited to his case and the environments.

CONSERVATIVE SURGERY—HOW FAR CAN WE CARRY IT?*

By H. C. McCoy, M. D., Algona, Ia.

The subject that I have chosen for my sketch was not a railroad employe, but a farmer, engaged in operating a steam thrasher. A messenger came for me, saying that Mr. A. had been severely injured by having his arm caught in one of the large wheels of the machine. The accident occurred as night was closing in, as the messenger reached Algona, some nine miles distant, about 8 p. m. The messenger thought amputation would be required, so I went prepared to remove the arm if need be. Reached his home about 9:30; found him in a somewhat depressed mental condition, as he was afraid that the arm would have to be amputated, and for him in that contingency the outlook was dark, as he had a mortgage on his farm, given a short time before. When I had looked him over as carefully as I could, as we had but a dim light—an ordinary kerosene lamp and barn lantern—and discovered the condition of things and was considering what was best to be done, he remarked to me: "If there is any way to save the arm I want you to do so." I explained to him the great danger attending such a contused and lacerated condition and the time it would take to restore it to a normal condition. He then remarked that time was no object with him if the arm could be saved.

From him and some bystanders I secured the main features of the accident. As it was getting dark they were cleaning up and leaving things in shape for the night. When reaching over one of the large wheels in some way a light coat he had on got caught and so his arm was drawn in; it was caught about the middle third of the humerus, following down the exterior surface of the arm, passing over the hand and little finger. The marks of the cogs were easily to be seen from the point of contact until the arm and hand had passed from between the cogs, so we had all the oil, dirt and grease that we would usually find in a railroad accident. In making a careful examination of arm and forearm I found the bones and arteries intact, with the exception of the bones of the little finger and a portion of the hand. The injured portion of the arm was almost entirely denuded of cuticle. A strip 1½ to 2 inches wide had escaped the crushing force of the cogs and was not detached; the rest of the cuticle was hanging loose from the arm. There had been but little loss of blood.

Before proceeding to dress it I washed the wound as thoroughly as I could under the

* Read at the fifth annual convention C. M. & St. P. Surgeons, Chicago, 1897.

circumstances, using a solution of permanganate of potash in warm water. After cleansing the wound and making it as antiseptic as possible, I then applied a strong solution of carbolic acid to the denuded tissues and adjusted what was left of the cuticle, removing all that was badly bruised and lacerated. Used a few stitches but had to trust largely to adhesive plaster and bandages, absorbent cotton, wet with a solution of the permanganate, for dressing, to be renewed every hour without disturbing the dressings. As he complained of pain I gave some morphia hypodermically before dressing, and repeated it before leaving for home, and also gave some quinine in 5 grain doses, to be taken every four hours.

The following morning found he had rested reasonably well; examined the wounds carefully and became more hopeful of saving the arm, though there were some indications of tetanus. I made no mention of this to him, but told him I would do the best I could to save the member for him. Nothing untoward happened for a few days, but about the tenth day a well defined line of demarcation was noticed, extending from the end of the little finger to the wrist. He was told that it would be necessary to remove the little finger and the portion of the hand involved, which was done the next day. The healing process could have been hastened by skin-grafting, but the patient was averse to having it done, and there was no one volunteered to furnish any cuticle, so after considerable time and patience the arm healed and is fairly useful, though for some time it was sensitive to the cold.

I saw him last Saturday and he feels very proud of his arm and says he has as good use of it as ever. The cogwheel marks are still to be seen, but as they are covered up by his clothing they are no source of annoyance to him.

Another case occurred in a young man of 28, who had been out hunting, and in taking his gun out of the buggy drew it toward him by the muzzle, and he received the charge of shot in the palmar surface of the hand, destroying the middle finger and the metacarpal bones. When I had looked the wound over carefully I told him that we could save what was left of his hand, and that it would make him quite a useful hand. To my great astonishment, he said he wanted the hand amputated at the wrist and insisted it must be done. I told him of course we could make a nicer operation to remove it as he wished, but we would dress it so as to leave him a very useful member. He was still so persistent in wanting it removed that I could not fathom his reasons, until a few days afterward he told me that he had some accident insurance and wanted the companies notified. In looking over the policies I found that $3,000 was allowed for the loss of a hand, so some light dawned on my mind. I pursued the same treatment and dressings as in the preceding case, and in a short time the hand was healed up, and in fair shape. As it began to fill and granulations were filling up the open space I kept drawing it together with adhesive strips. This caused some pain at first, but hastened the process of healing, and he was discharged with a fairly useful hand.

Now there is nothing startling or uncommon in these cases, but they show what can be accomplished under adverse circumstances. In the first case, as Gail Hamilton would have put it, we were nine miles from a lemon with no facilities for the care of a surgical case; but two rooms to the house, one used as a sleeping and living room, the other used for culinary purposes, so the sanitary condition was not of the best.

About the time the second case was under treatment one of the railroad brakemen got his hand and fingers pinched between the bumpers of a freight car, so that two of his fingers were slightly fractured, accompanied by considerable contusion. I dressed his hand and fingers and believe that if he had remained in my care would have saved them, but he was anxious to go to his home, and while there his family doctor was called, with the result that both fingers were removed, leaving him a hand of but little use, as the fore and middle fingers were removed. I saw him a few weeks afterward and asked him how he was getting along. When he told me that the doctor he called at his home said he could make a better looking job of it and that they would heal quicker, etc, but still I think that the conservative course is best; save all you can, even if it does take more time and patience. This has been well illustrated by our worthy secretary in a paper read before

the National Association of Railway Surgeons at St. Louis in May, 1896. Would that it could be in the hands and then memorized for future use by every surgeon who is brought in contact with this class of cases.

DISCUSSION.

Dr. O. E. Plumbe, Rock Valley, Ia.: About four years ago I had a case similar to the one mentioned, a thrashing machine accident. A boy about 18 years old caught his arm in the gearing of the machine and two physicians were called before I was. They decided an amputation was necessary. I saw the case about 24 hours after the accident. I looked the arm over; there were two fractures between the wrist and elbow and one of the arms above the elbow. I could detect the pulsation on the radial side of the wrist very perceptibly; on the ulnar side I could not detect any. They had the arm done up in rectangular splint. I told them that I could not see any necessity of amputating; at that time his general condition was good, and I took the splints off, laid the arm on a pillow and applied antiseptic application to the soft parts. About a week afterward the contusions had healed up; I placed the arm in plaster-of-Paris; the elbow is slightly ankylosed—in that case I think a number of years ago it would have always been amputated. I remember another case, that of a man losing his arm in handling a revolver carelessly, and when he came to see me he insisted that I should amputate the hand. I told him that no man in his senses would think of it, but he still persisted and said that if I would not do it he would go to someone else, but after a time he came to his senses and submitted to a dressing, and a few weeks afterward I learned that the man had a large accident insurance and that he wanted the arm taken off. It shows to what extent some men will go to get money.

Dr. S. E. Robinson, West Union, Ia.: The point that just occurs to me is that I want Dr. McCoy to emphasize that we in the country have a good deal better septic conditions than those in the city, though we may not have as much skill. We have not as fine instruments, but we are surrounded with everything else to make us conservative surgeons instead of operating surgeons. We have an aseptic residence, then we have a holy fear of severe surgical operations and we do much more conservative surgery than we would if we were not quite so timid. Now I had a case of thrashing machine accident; the man was standing on a horse power thrasher; his leg passed through between the big revolving wheels, where it was but three-fourths inch space between; crushed the leg badly; another physician was called to the case and I was called to amputate. The other physician had been there and determined upon it and sent for me to do the operation.

When I got to him he would not allow it; it was out in the country and he was sitting on the floor holding his foot up on the knee. The whole thing looked crushed. We gave him an anæsthetic and in getting him to the table I carried the wounded limb in my own hand and discovered pulsation in the tibial artery. It had been left intact, so that the circulation went through, so we concluded to wait a day or two and fixed him up, and when the man came from under the anæsthetic he was not in a very good humor; he had a great deal of money and he thought that we were going to experiment on his case. The other doctors resigned the case. After about ten days they still wanted to amputate, but I said they would not take that leg off with my consent, and so we fought for nearly 30 days and the man got well with a leg that he walks upon to this day, and that was several years ago, and he is in perfect health. If I had had a little more courage the man would have had a wooden leg, and the whole thing is due to the fact we are continually in an aseptic media in the country.

Dr. W. B. Johnson, Savanna, Ill.: I do not think we ought to be driven from surgery through fear of operation. If a man is afraid to do it he should have somebody do it for him. I think we should always practice conservative surgery, no matter whether we are afraid to amputate or not, and I think these cases that have been cited are all cases which should not have been operated on primarily under any circumstances. Where there is, as in these first two cases, a blood supply and, as I understood it, no bony lesion, I think it would be next to criminal to amputate primarily. The last speaker has shown in his case the result that may come when the pulsation in the artery continues, although there may be an utter comminution of the bone that

we know will result in gangrene and sloughing. I think these should be left for secondary operation always.

Dr. McCoy, in closing: Mr. President, I think anyone that is acquainted with Dr. Robinson knows that if he don't operate that it is not from fear, but is from discretion.

PRIMARY DRESSING IN RAILWAY INJURIES.*

By Dr. M. D. Knox, Hillsboro, Tex.

Gentlemen:—The importance of doing this work properly is oftentimes a very serious duty. Unfortunately railway employes cannot always keep themselves in a scrupulously antiseptic condition, as their vocation necessarily renders them unfit for ideal antiseptic surgical work. These emergency cases can never be prepared beforehand. It is entirely out of the question, since employes have no immunity against accidents. So it behooves us, as local surgeons (for it is the local surgeon who is at the front), to strictly study these conditions and in a measure keep ourselves in a position at least to receive them, and best prepare them for the hospital and the subsequent treatment.

All dressings from start to finish, for a mere abrasion up to the most grave surgical interference, should be given careful attention, though the first is of the greatest importance. And here is the place for the local surgeon to show his tact and skill in his management of these cases. The local surgeon who believes that all he has to do is merely to ease pain, immobilize the injury, cover up and hide the wound from view, and who in blissful ignorance ships his patient and the whole responsibility to the chief surgeon, feeling that he has fully complied with the teaching of modern surgery, has made a serious mistake—for he has only in part done his duty. Of course when the patient is in pain, and as a rule when first called you find him so, you should by all means make him comfortable. Comfort should at all times be seen after.

Gentlemen, it is the importance of the first dressings that I so much wish to emphasize. Example being far more desirable than precept, I shall endeavor to make my paper practical. Theory is beautiful, but unfortunately is not always borne out by practice.

Imagine, if you please, a large gaping wound, such as you have all witnessed, with a terrible loss of substance, of both bony and soft parts; the wounds mixed with dirt, dirty clothing, cinders, coal dust and impure grease. With all this filthy foreign substance ground into and thoroughly intermingled with both healthy and dead tissues, presenting a picture that looks as though it was next to impossible to clean. To fill such a cavity with iodoform or any other of the so-called sure antiseptics, pack with moist gauze, place a neat and well-fitting bandage over the whole business, and ship the poor fellow to the hospital without first cleansing the wound would be shameful neglect.

I will suggest here in brief what I would consider a good course to pursue, as I understand it in this class of injuries, and if I am not thoroughly orthodox I think it at least rational treatment. First wash the parts and the suroundings thoroughly with weak sublimate solution or carbolic acid. These washes are not so much for the purpose of murdering resident germs as they are to destroy those that may have found lodgment on or about the surfaces.

Antiseptics and germicides are not the same thing, any more than a deordorizer is a disinfectant. Antiseptics are intended not so much to destroy pyogenic and putrefactive organisms as to retard their growth. To destroy them would require a sublimate solution something like 1 to 1,000, or about a 4 per cent solution of carbolic acid. To apply this concentrated solution to a raw, unprotected surface would do more than would be desired. It would certainly destroy the cells as well, and not only delay karyokinesis, but cause a general destruction of all the tissues of low vitality, and likewise a multiplication of effete material to be gotten rid of, which means time, and time means an expenditure of force.

I wish to be understood as saying once for all that I do not believe that an antiseptic has yet been discovered which will successfully destroy poisonous germs that have once become deeply imbedded in the healthy or unhealthy tissues, without destroying more healthy and useful material necessary in making repairs than germs. Follow these weak

* Read before the Texas Association of Railway Surgeons.

solutions freely with sterilized salt solutions, used at a temperature approaching 120 degree F. Always use sterile water for your base.

With perfectly clean hands wash all foreign substances out as far as possible. Do not rub, scrub, bruise or contuse the already almost devitalized parts, employing mechanical, chemical and thermal sterilization, all combined, believing that you are carefully carrying out this awful technique in a Christian manner, like we have been hearing so much about lately.

Take your dressing forceps and a pair of curved scissors and carefully remove all ragged and dead tissues, that would interfere with healing. Give yourself all the time required consistent with the case to do a good job. Remember that the blood and serum constantly bathing the parts are antiseptic and nature's own remedy, and that there is nothing equal to it in keeping the parts in a pure and healthy condition for healing. Of course hæmorrhage should be controlled if present; do not be uneasy about anything short of this.

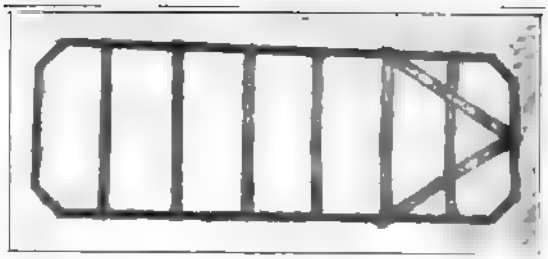

Fig 2. The stretcher detached and ready for use as a hand stretcher

If amputation is not to be considered, coaptate the parts as far as possible, gently squeeze or press all blood clots out and with your coaptation bring such tissues as properly go together back to their normal relation and structures, bone for bone, muscle for muscle, fiber, connective tissue, blood vessels and skin, all of a like character and affinity should be, if possible, evenly and accurately brought back to the tissue it was separated from, and such tissues that furnish the same nucleated cells. In doing this there is no question about getting not only quicker, but stronger union.

After the details have been carried out place the injured parts in a favorable position for rest and drainage; if drainage is required immobilize the parts, both to secure rest and to guard against further pain from handling or spasms of some of the muscles.

In closing a wound up, antiseptics may be freely used as an outside dressing; it may prevent any further entrance of poisonous germs.

THE H. L. GETZ IMPROVED BICYCLE AMBULANCE AND HAND-STRETCHER.

(Patent applied for.)

This novel device is designed for use when-

Fig. 1. The bicycle ambulance ready for use.

ever the original handstretchers are of necessity or choice made use of in transferring sick or injured persons. The stretcher is quickly, easily and securely mounted on any modern bicycle, lady's or gentleman's single wheel or tandem, without in any way marring the bicycle, for pleasure or business use, when the stretcher is removed. The stretcher proper can be used as any ordinary litter with satisfaction and convenience.

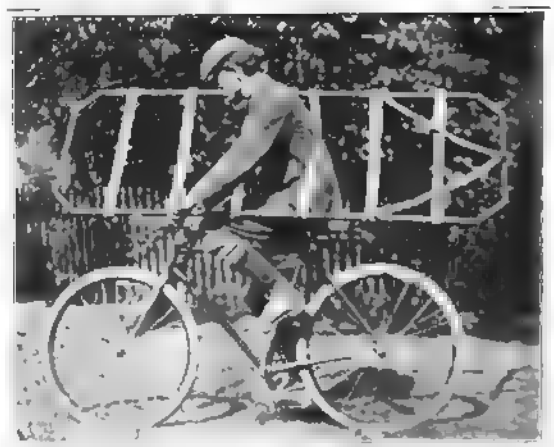

Fig. 3. Rider going to the scene of the accident with the stretcher swung over his shoulder.

The stretcher and attachments are made of inch bicycle tubing; weight of stretcher is about eight pounds. It is 26 inches wide and 6 feet long. It can be passed through the or-

dinary car window opening and is equally serviceable in army or private use. In going to the scene of accident the stretcher is swung over the shoulder of the rider, who sits on one of the cross arms or stretcher supports secured in the seat post, while he uses the other cross arm or stretcher support fastened into the handle-bar post the same as regular handle-bars.

When he reaches the scene of accident he dismounts, secures the stretcher to the cross arms which are already secured to the wheel, and, with the assistance of one or two bystanders, loads the patient on the stretcher, and with the help of one person, that is, two persons all told, the patient can be carried comfortably for long distances and over any kind of ground and any place where it is possible for two men to carry any person on the ordinary sort of stretcher, because they are relieved from carrying the dead weight of the injured person.

The price of stretcher and attachments for wheel is $25, and for the present can be secured by addressing the inventor.

An Extraordinary Surgical Experience.

By J. W. Hurt, M. D., Atlanta, Ga.

On May 7, 1898, I was called to police barracks to see a negro woman forty-three years old. When I arrived I found her with one-half of the upper lip gone on left side. She said she had had a fight with her husband two hours and a half before, during which he had bitten off her lip, and that the police had arrested them. I washed the wound and then began to look about for some convenient place to get a piece of skin to transplant. Every place I suggested she would object, saying she was a washerwoman and had to work for a living. I told her I must have some skin from somewhere, so she suggested I send to her house. about half a mile away, and get her lip. Acting on her suggestion, I sent a call man for it. The daughter looked about the room where the fight occurred, found the lip where the husband had spit it out on the floor, wrapped it up in an old dirty cloth, and in a little while the call man was back. I took the lip, washed, scraped and cut the dirt off, fitted it to the raw surface, and sewed it back with thirteen stitches. I put on some antiseptic powder and covered it with several layers of isinglass plaster, and making her as comfortable as possible, sent her home with instructions to call at my office in the morning, this being 10 p. m. She claims to have called twice, but failing to find me, she returned home and began to attend to the lip herself. I lost sight of her, and thinking by her not calling she had got some one else to attend her, in about three weeks I decided to look her up, and to my surprise I found the wound had entirely healed with perfect union on all sides. She washed the wound with carbolic acid water and took out the stitches herself, and when I last saw her there was only a very slight scar in the middle of the lip with a very slight tenderness on pressure. The lip is not drawn or disfigured in the slightest; the expression is the same on the left as on the right side, and she says she suffers no inconvenience from it, and that she feels as well as ever she did. When the lip came it was blue and cold, without any apparent signs of life, having been off two hours and a half, but, as I stated before, it grew back nicely, with only a very small scar that is scarcely noticeable.—Med. Age.

Mississippi Valley Medical Association.

The twenty-fourth annual meeting of the Mississippi Valley Medical Association will be held at Nashville, Tenn., October 11-14, under the presidency of Dr. John Young Brown of St. Louis, Mo.

This association is second in size only to the American Medical Association and has done most excellent scientific work in the past. The annual addresses will be made by Dr. James T. Whittaker of Cincinnati, on Medicine, and by Dr. Geo. Ben. Johnson of Richmond, Va., on Surgery. The mere mention of the names of these gentlemen establishes the fact that the association will hear two scholarly and scientific addresses.

Nashville is a most excellent convention city and is well equipped with hotels, and with the record of the meeting in Louisville in 1897 as an example, the local profession, under the leadership of Dr. Duncan Eve as chairman of the committee of arrrangements, has prepared to have a better meeting.

Already titles of papers are being received. These should be sent to the secretary, Dr. Henry E. Tuley, 111 West Kentucky street, Louisville, Ky., as early as possible to insure a good place upon the program. Reduced rates on all railroads will be granted on the certificate plan.

An aseptic dressing placed over a wound that is expected to unite by first intention. should be left undisturbed until it is time to remove the stitches, or until there is reason to believe that the case is not running the expected aseptic course.—Ga. J. Med. and S.

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THE PHYSICIAN AS A WITNESS.

Those who heard the eloquent address of Mr. Osler at the Toronto meeting will undoubtedly be glad to have it in a permanent form, as it appears elsewhere in this issue. Mr. Osler comes of a Canadian family distinguished in law, medicine and finance. His equally celebrated brother, Prof. William Osler of Baltimore, has recently received the fellowship of the Royal Society of London, the degree of LL. D. from Aberdeen University, has been appointed dean of the medical faculty of Johns Hopkins University, and is prominently mentioned as the successor to the lamented Dr. Pepper at Philadelphia. A veritable "embarras de richesse."

In another column will be found an excerpt on a subject somewhat similar to that of Mr. Osler, entitled "The Medical Witness in Court," by Dr. Buckley. While this does not cover exactly the same ground, yet taken in connection with Mr. Osler's address it makes very interesting reading and shows the subject as taken from the standpoint of another learned profession.

TRANSPORTATION OF THE WOUNDED.

The question of transporting the victims of accident is always an important one, as is evidenced by the numerous devices for this purpose for use both in time of war and of peace. We illustrate in another column what seems to be an ingenious arrangement devised by our associate, Dr. H. L. Getz. The device was shown in its crude form at the Galveston meeting, but has since been greatly modified and improved. It will be remembered that at the same meeting Dr. Ortega of Mexico described a compact stretcher made of bamboo.

In the Journal of the American Medical Association,* the Nestor of Chicago surgeons, Dr. Edmund Andrews, made a strong plea for the employment of the Japanese jinrikisha as a wheeled litter for removing the wounded in battle. He points out that hand-litters and stretchers worked very well under the conditions formerly existing when old-fashioned weapons were used, but with modern long range guns the danger belt has been greatly widened, and the ambulances and field hospitals will have to be kept far in the rear.

The principal objection Dr. Andrews sees to the use of the wheeled litters, is that their use is impracticable on rough ground. This objection holds good also for the tricycle ambulance described in the Railway Surgeon last year, but will be nearly obviated by the use of the bicycle ambulance, for it takes up very little space and can be trundled along very narrow paths.

SURGEONS ON ELECTRIC ROADS ELIGIBLE FOR MEMBERSHIP.

At a meeting of the Executive Board held during the Toronto meeting, it was decided that surgeons for surface and elevated street railroads are eligible for membership in the I. A. R. S.

*June 11, 1898.

Translations.

Traumatic Osteomas.

By Dr. A. Depage, Brussels.

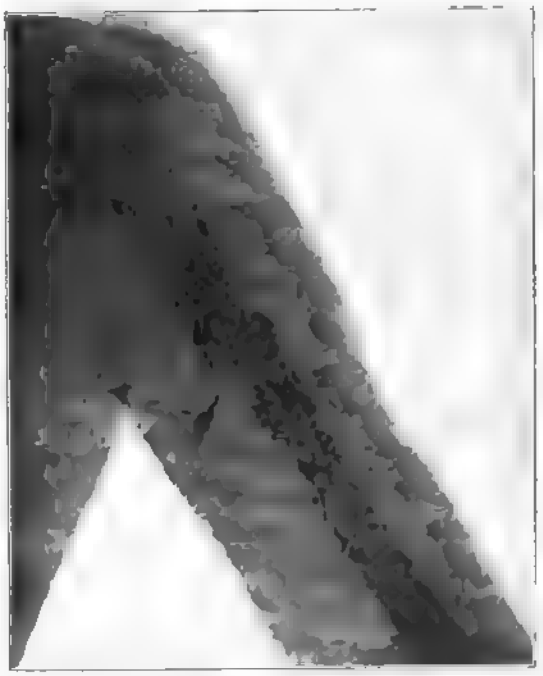
I have recently met with two cases of traumatic exostoses or osteomas which are very interesting, and one of them (with the aid of radiography) greatly aids in elucidating the pathogeny of this affection.

Case 1. M. H., aged 18, a pupil in the military school, fell on October 18, 1897, and dis-

RADIOGRAPH FROM CASE 1.

located his elbow. This was reduced by a neighboring practitioner and the patient subjected to massage daily under the direction of Dr. Wieslander. I examined him for the first time four or five days after the accident and found that the reduction was perfect, the landmarks of the articulation occupied their normal situation and that the joint surfaces had regained their normal relations. There was but slight swelling over the point of the elbow and a rather large bloody effusion on the antero-internal aspect of the lower end of the arm. After three or four weeks' treatment the swelling had disappeared, so to speak; the movements of the forearm could be executed with a certain amplitude, but a hard tumor had appeared in the anterior aspect of the lower end of the humerus, immediately above the joint, in the depth of the brachialis anticus and behind the biceps tendon. This tumor rapidly increased in volume and soon attained the proportions of a hen's egg; little by little it impeded the movements of the forearm on the arm; it was applied directly to the humerus, being slightly mobile on this bone, and the brachial artery could be plainly felt beating in front of it.

I subjected the patient to the X-ray and I show you the radiograph taken at that time (Fig. 1). In reality the tumor was much



RADIOGRAPH FROM CASE 2.

larger than appears in the photograph, which only gives the image of the primitively formed parts of the neoplasm, while the young tissues of the peripheral layer are penetrated by the rays. The tumor thus seems somewhat distant from the bone, which was not the case.

The propriety of surgical intervention was debated on several occasions The nice point was to ascertain if the tumor had intimate relations with the joint capsule or if it was independent. If the latter were the case I should not have hesitated to interfere, but the different confreres who were called to examine the patient could not give a decisive opinion in this regard. I feared the neoplasm was inti-

mately adherent to the capsule, whose sacrifice would almost surely have been followed by ankylosis of the joint.

I temporized and continued the massage of the joint for many months.

This produced no amelioration in the patient's condition; on the contrary, the movements became more limited and the adhesions with the bone were such that they seemed to form one piece.

For fear of seeing these complications become more serious, an operation was decided on and performed February 3, 1898.

Chloroform narcosis, hæmostasis by Esmarch's bandage, rigorous asepsis. An incision about five inches long was made, starting from the inner border of the biceps, four finger breadths above the bend of the elbow and descending obliquely to the mid line of the forearm, one and one-fourth inches below the elbow. The aponeurotic expansion of the biceps was severed, the muscle, the median nerve and the artery were retracted to the outer side. I incised the fibers of the brachialis anticus and thus laid bare the tumor, which was strongly adherent to the muscular tissue and seemed to make part of the bone. When it was free for its whole circumference I separated it from the bone, taking care to preserve the ligaments of the joint, with which it was only in contiguity. Hence the joint was intact. Sutures of the different layers; dressing; the arm was kept in a vertical position for many days.

The wound had entirely healed at the end of two weeks and the movements of the arm had slowly regained their usual extent. I wish to call attention to a circumstance compromising the success of the operation, and that is complete paralysis of the arm due to the constriction by the Esmarch bandage and which has not entirely disappeared yet [June 19].

Case II. L. H. fell from a bicycle, receiving a comminuted fracture of the upper part of the arm.

I show you here the radiograph taken two or three days after the accident. When we examine it we see to the inside of the fractured point a dark zone, which is nearly on the same level as the perforation in the skin. At first I attached no importance to this, but later on, as we shall see, it became really important. Some time after the fall a true stalactite could be found on the inner surface of the bone, and which, mobile at first, became little by little soldered to the osseous tissue. It was an exostosis, a true osteoma similar to that observed in the preceding case, as shown by the radiograph taken two days ago (Fig. 2). You see that it shows a dark zone nothing like the early photograph; it does not give the image of the tumor, which exists nevertheless. This is because the tumor is made up of young tissue surrounding a central nucleus formed of the bony fragment which was detached at the time of the traumatism and which alone gives the image. If we look closely at the first radiograph we can even see the spot where the osteo-periosteal flap was torn from.

The two cases which I have presented to you seem to me worthy of notice. The first is especially interesting on account of the development of an osteophyte at the joint following a dislocation. It is certain that if on the one hand we had not been able to follow the patient from the beginning, and on the other hand not had radiography, it would have been difficult to make an exact diagnosis. We should have had to suppose the presence of an articular deformity due either to a badly reduced dislocation or to a fracture of the elbow.

The second case clears up the pathogeny of the first. Many theories have been promulgated to explain the production of these osteophytes. The most plausible is the one which attributes these bony productions to a flap of periosteum torn from the bone, but this hypothesis had not been really demonstrated. From this point of view our case is some genuine evidence (Ann. Soc. Belge de Chirurgie Juillet 15, 1898).

Negligence.

A landowner held ordinarily under no obligation to a licensee or trespasser to keep his premises in a safe condition, though such licensee or trespasser is an infant. Delaware, L. & W. R. Co. vs. Reich (N. J. Err. & App.), 40 Atl. 682: A railroad company held not liable for injuries to a child while on its turntable. Delaware, L. & W. R. Co. vs. Reich (N. J. Err. & App.), supra: Where the owner erects on his land a structure attractive to children he does not thereby invite children to enter. Delaware, L. & W. R. Co. vs. Reich (N. J. Err. & App.), supra.

Medico-Legal Notes.

Carriers.

A street car company is a common carrier. State vs. Spokane Street Railway Company (Wash.), 53 Pac. 719: A passenger riding on the platform of a car takes upon himself the duty of looking out for the danger of being thrown from the platform by the swaying of the car. Watson vs. Portland & C. E. Railway Company (Me.), 40 Atl. 699: A person riding on the platform of an electric street car is not from that fact guilty of contributory negligence. Watson vs. Portland & C. E. Railway Company (Me.), supra: A passenger riding on the engine without permission, and injured in dismounting, held not entitled to damages, unless the injury was result of wanton wrong. Mobile & O. R. Co. vs. Bogle (Tenn. Sup.), 46 S. W. 760: Burden of proof as to contributory negligence of passenger injured in boarding train is on the company. Missouri Pacific Railway Company vs. Foreman (Tex. Civ. App.), 46 S. W. 834: Recovery may be had for injuries by sudden jerking of train as passenger was attempting to get on board on instruction of conductor, though engineer did not know of it. Missouri Pacific Railway Co. vs. Foreman, supra.

Master and Servant.

An employe can recover actual damages, including loss of time, pain and mental anguish. Bussey vs. Charleston & W. C. Ry. Co. (S. C.), 30 S. E. 477: A railroad company is liable for injuries to an employe caused by negligence of another employe having right to direct him. Bussey vs. Charleston & W. C. Ry. Co., supra: The master should provide suitable appliances, and keep them in proper repair. Bussey vs. Charleston & W. C. Ry. Co., supra: Where the injury was due to a casualty, the happening of which was reasonably to be anticipated as a natural incident to and consequence of the work, held that the servant took the risk. Noble vs. Jones (Ga.), 30 S. E. 535.

Railroads.

Whether a pedestrian was negligent in crossing a railroad track is a question for the jury. Shetter vs. Ft. Worth & D. City Ry. Co. (Tex. Civ. App.), 46 S. W. 875: Defendant was liable where its engine negligently ran over plaintiff on a public street, even though the injury was not wantonly inflicted. East St. Louis Connecting Ry. Co. vs. Reames (Ill.), 51 N. E. 68: The reliance of an engineer of a train on the presumption that a man on the track would get to a point of safety is not wilfulness. Ullrich vs. Cleveland, C., C. & St. L. Ry. Co. (Ind. Sup.), 51 N. E. 95.—Chicago Law Journal.

Exhibition of Rupture to Jury.

In the personal injury case of the C. & A. R. R. Co. vs. Clausen, in which the supreme court of Illinois affirmed a judgment against the company and denied a rehearing, June 10, 1898, it was complained that the trial court had improperly permitted the plaintiff below to exhibit to the jury a rupture, alleged to have been caused by the accident, set forth in the case. This leads the supreme court to say that it is primarly within the discretion of the trial court to permit an injury to be shown to the jury for any legitimate and proper purpose that will aid in the determination of the issue, and that while it is questionable whether the exhibition referred to was proper, inasmuch as the existence of the rupture and the nature and extent of it were not controverted by the defendant, and it is questionable whether its only effect would not be to excite feeling, rather than to aid in settling any disputed question, the court does not feel prepared to say that such was the case or that there was a clear abuse of the discretion confided to the trial court.—Jour. Amer. Med. Asso.

A decision of interest to railroads has been rendered by the court of appeals of Colorado. A train running in a severe snow storm was struck and derailed by a snowslide in the mountains at a point where a slide had never been known to occur before. The train had been managed in all respects as was usual in case of storms. It was equipped with an ordinary push snow plow, which had usually been sufficient to keep the track clear, and, on this occasion, had kept it so clear that the train was nearly on time at the place of the accident. In this state of facts it is held that the snowslide was an inevitable catastrophe which the railroad company was not bound to anticipate. Accordingly, a verdict in favor of a passenger for injury received thereby was set aside. The fact that a rotary plow, sent ahead of the train, might have prevented the accident, is held not to affect the question of liability, as the company was under no duty to take such a precaution, under the circumstances.—Railway Age.

Extracts and Abstracts.

Ligatures and Sutures.

By Thomas B. Spence, M. D.

(Continued from Page 163.)

DISCUSSION.

Dr. J. P. Warbasse said that with regard to the use of silver wire as a suture material, his conclusions had been somewhat different from those arrived at by the reader of the paper. He knew of no suture material for the application of a running subcuticular suture, particularly in the abdomen, which gives more perfect results than fine silver wire. The experience of Dr. Spence he knew had been in favor of the linen suture for subcuticular purposes, and it is certainly a very acceptable suture. But it had seemed to the speaker that the advantage of a fine silver wire suture for this purpose lies in the greater rigidity of the wire, it is often necessary in using a silk suture in this way to fix the ends. This is usually done by holding it until it becomes fixed to the skin by the drying of a little blood or by touching the ends with collodion. But with the silver suture, if it is drawn out tightly and straightened out under the skin, the most perfect apposition is secured. And in those cases in which he had used the silver wire suture it had seemed to him that there had been less irritation in the track of this suture than in the track of the silk. The only objection to the suture is that because of the little angulation which will occur in wire, it has to remain in place longer than the thread suture before it can be drawn out. He had seen cases in which it had to remain two and one-half weeks before it could be drawn out.

At a recent meeting of this society the question of buried materials was discussed, and Dr. Bristow called attention to the fact that the action of the normal salts of the body upon silver results in the formation of a mild antiseptic product, so that in case any bacteria are buried with the suture we have in the silver wire an antiseptic in the suture itself, whereas in the twisted thread sutures we have a culture medium. It seemed to the speaker that while discussing the suture question this matter of the subcuticular suture should be dwelt upon, for he believed that here is a method of closing wounds which is used too little by surgeons, particularly in cases in which as little scar as possible is desired. For cosmetic effect, he knew of no suture which gives such beautiful results as the subcuticular suture. He had only recently seen some cases of small operations about the face which he had done two and three months ago, and in which at the end of that time no scar is evident at all. And this is something which could not be accomplished by the old method of suturing through the skin itself. And these were cases in which subcutaneous injection of cocain was done for the purpose of anæsthesia, which makes a perfect healing even less certain than when general anæthesia is employed. The speaker believed that this subcutaneous suture is a most valuable one and one which shortly will be used much more than it is at the present time.

Dr. W. C. Wood said that he agreed with the views of the writer of the paper, because he had been very much influenced by the "Brooklyn School of Surgery." But last night discussing the matter with one of the staff of the Roosevelt Hospital, he was told that they use the subcuticular suture not at all. They use a continuous suture including simply, or as nearly as possible, the outer layers of the skin. They use no kangaroo, but rely for buried suture upon catgut. That is true of abdominal sections and hernia cases. The sutures through the abdominal wound are not placed layer to layer in many cases, but simply a large suture is put in including the bulk of the abdominal muscles and fascia, and occasionally a suture that includes the upper muscular layer with the skin. He mentioned this to show the great variance among surgeons as to their methods, and it seems impossible to convince people who have been doing one method successfully of the superiority of other methods.

Dr. B. O'Connor said that he had been associated with Dr. Bull of New York in four abdominal cases, and had talked with him in regard to suture material. According to his own statement, he and his assistants in his service at the Hospital for Ruptured and Crippled, probably do more herniotomies than any other man in New York. Dr. Bull said he had absolutely discarded silver wire and used kangaroo tendons (sterilized by himself) exclusively, and had had very satisfactory results. Concerning silkworm gut, the objection raised was that it was rather stiff and also sometimes hard to see on account of its color. Dr. Bull has been staining it by a process that may be of interest. He had been in the habit of soaking the silkworm gut for half an hour in a solution of sulphate of iron and then transferring it to an aqueous solution of hematxylon, then washing in sterilized water and immersing for half an hour in 1 to 1,000 bichlorid; it then comes out coal black and very pliable indeed, and he has had very good results in its use.

Dr. L. S. Pilcher said that a simple and hence a better way to color silkworm gut than the method detailed by Dr. O'Connor was to simply leave on the red string colored with

aniline dye, with which the skin of strands is tied up, as it is found in the strips, and put the whole thing in water with a little carbolic acid for the purpose of disinfecting it. In a short time the silkworm gut will be colored a very beautiful dark red color, just as distinguishable as if it was black, answering every purpose therefore without subjecting the operator to all of the details of the complicated process described.

Of course in the matter of suture material every man will have his own peculiar preferences, arising very largely, first, from his experience, and second, from his prejudices. What men do after they really get into work, in the selection of materials and methods depends very largely upon these two elements. In the beginning, of course, men are influenced largely by the way they are taught, but later they are influenced by the double conditions of what their experience has been and by that peculiar combination of mental processes which may perhaps be well styled "prejudices." Some men are never satisfied unless then can find something that is different from that which other men have, or something which has the element of novelty about it, or something which demands some peculiar method of preparation or some complicated process in connection with which there is supposed to attach to the procedure or the substance special merit. He was confident that many things which had engaged the attention of surgeons, many materials which they had been induced to use, had been commended to them largely through such influences rather than from any special merit which they themselves had intrinsically. He asked whether the tendency of the present time and the highest and best interests of surgery were not to be found in the simplification of technic. The very word "kangaroo" tendon is in itself a violation of the cardinal tenet. It is absurd to suggest that surgeons should depend for their ordinary suture material upon the comparatively scarce and with difficulty obtained material that is to be found in the tail of an animal in the Antipodes. If for no other reason, it seemed to him that the surgeon should resolutely set his face against the adoption of such a material and should strenuously strive to secure a material which was to be found more closely at hand and more universally accessible.

When catgut was introduced into surgical use as a thread for whatever purposes a thread should be needed, the man who introduced it builded wisely. As time has gone on the experience of the surgical world has been more and more toward its adoption for general use, rather than to any new materials which have been suggested to supplant it. Its disadvantages are known, but its disadvantages may be overcome, and at present there is no question but that, with proper precaution, it can be used as safely, that it can be relied upon as certainly, as substances which have been suggested to take its place. He would go a little further than Dr. Spence had gone in his paper and say that it is difficult to conceive of the condition in which it would be necessary to resort to either a strand or catgut so thick that its sterilization throughout its whole substance would be difficult or that it would be necessary under any circumstances to braid together several strands and thus have a complicated ligature apparatus. He would suggest that in all those cases where there was such a thick mass as that a moderate sized thread could not be trusted to ligate it, that it would be better to split up the mass that was to be ligated rather than to use the heavier suture. And except in rare cases it would be found comparatively easy to separate a mass of tissue into fasciculi small enough to be ligated with a cord of small caliber rather than to take a large mass and tie it with an assortment of cords braided together.

Anyone who is doing complicated operations will find special conditions in which, according to his judgment, various materials will best answer the need of the particular case. There will be conditions in which the silver wire will be called for; conditions in which a silk thread will be indicated, and other conditions in which the silkworm gut will be better, and ditto for catgut, and he is the wise surgeon who has them all at his command, and who, taking his judgment as to the particular conditions which are presented to him, will choose the one best adapted to the particular case. The thing for surgeons to do is to study the qualities of these different agents and then, having them prepared so that they shall not introduce in any case the element of infection into it, they may pass on with a confident step into the various operative conditions which they may have to deal with, using in each case the special material which is peculiarly well adapted for the particular condition.

He illustrated this thought by two recent cases which have been under his care: First, an ordinary case of hernia in which, after the sac has been enucleated and the anatomical elements presented, properly dissected and exposed, when the sac is cut away there is presented an opening in the peritoneal cavity of perhaps an inch and a half or two inches in length, which is first to be closed with a moderate sized catgut thread, the ordinary catgut thread applied as a running suture until the peritoneal cavity is shut off. There are next the aponeurotic and muscular layers to be sutured for the purpose of strengthening the abdominal wall. Now, a rather small-

sized chromicized gut thread should be used, which has the quality of remaining unabsorbed for a period varying from fourteen to twenty days, during which time it remains unirritating and supporting the parts in apposition, and at the end of which time and when the parts have become thoroughly adherent and the bond of union becomes organized it has been absorbed and has disappeared. Then in the superficial fascia of varying thickness which is to be closed over this, a running layer of small-sized ordinary catgut is applied. Now there is left simply the wound in the integument, which is superficial, tends but little to gape and needs simply a subcuticular suture, either of common silk or silver wire, as may be chosen by the operator for its secure closure. The result will be a wound which heals with hardly any scar, an union which may be relied upon to secure a permanent closure and a permanently strong abdominal wall.

Take also a case of complete rupture of the perineum, where there is a rectal mucosa to be sutured, and there is a vaginal wound to be closed. In such a case as that if the rectal mucosa is brought together with a line of suturing of moderately fine catgut, if the muscular and fascial tissues are brought together and are secured with buried chromicized gut sutures, if the vaginal wound has had a line of suture of ordinary catgut, and if to the perineal wound there is applied the interrupted silk suture, there will be presented a condition that will most certainly secure a prompt healing of the wound and will be borne with the least discomfort by the patient. The same principles applied in the various kinds of wounds should lead one not to throw aside any kind of suture material that may be presented, but rather to choose for the particular condition what is best adapted to that special condition.

He thought that the disinfection of catgut could be secured with positiveness, for the large experience of many operators by different methods at the present time warrants the statement that it can be reliably disinfected.

Is silk thread or silver wire to be preferred for buried sutures? It seems to him that the almost universal experience of surgeons shows that in a very considerable portion of the cases they do ultimately produce irritation and are a source of great disadvantage in the history of the patient, and that the same results could be obtained in the use of a proper size of chromicized catgut.

Dr. H. B. Delatour said that he had tried the method of suturing described by Dr. Wood as done at Roosevelt Hospital, in passing the silk suture only partly through the skin, and had been well satisfied that it is not as satisfactory in his hands as the subcuticular suture. It is not as easy to get out, and does not give any better line of union, and the chances of infection from the skin are greater.

As between silver wire, linen thread, and silk for subcuticular suture either linen thread or silk is to be chosen. The silk is more easily introduced; it is certainly more easily withdrawn than the silver wire. He had never seen a case of marked irritation about it, and as for having to fix it down with collodion or something else, he had never had to do it. He was well satisfied that with either the linen thread, cotton thread or silk, the result will be better than with silver wire. The antiseptic power of the silver must certainly come to an end at some time, if it does have such a power, for we have all seen silver wire set up a persistent and long-continued irritation.

Dr. T. B. Spence said that he did not prefer silk for subcuticular suturing. but that he used linen thread for the reason that it is a little rough and holds better. Silkworm gut may be colored with the aniline dyes, but he could hardly see the force of the argument. White, he thought, was good enough.—Brooklyn M. Jour.

The Medical Witness in Court.

By Thomas M. Buckley, M. D.

"The Medical Witness in Court" is the title of this paper, although, perhaps, it would have been better to say "The Medical Man in Court," as the medical man appears in court in about three rôles, viz.: 1st. The medical man when endeavoring to collect his just dues. 2d. The medical man endeavoring to exonerate himself from a charge of malpractice. 3d. The medical expert.

It is understood that the duties of a physician are such as require him to answer calls and render services at all times and under difficulties, that it is, in fact, indelicate and even impossible for him to investigate and determine who is going to recompense him for his services; this being the state of affairs, it frequently happens that the medical man takes great chances of getting nothing for his services, owing to the lack of being able to determine the legal responsibility.

The legal questions at issue and the way they are disposed of are manifestly interesting; for convenience, however, we will only discuss the question of the responsibility of a private person who sends for the physician to attend to someone else, and which has lately been decided by the courts that such a person is not responsible to the physician for such services rendered. The point usually to be decided is whether the person so ordering the physician acted for himself or as an agent for the patient. We naturally take the view

in an honest way that one or the other will pay. As the law states, it is a general principle of the law of agency that one who procures services to be done for another is not himself chargeable as the debtor, unless he omits to make known his principal, or erroneously supposes that he has authority, or agrees to be responsible, or promises to pay when bill is rendered, or by doing or saying something which justifies the person who is to perform the services in supposing that the one who applies to him engages to pay for them, though there is an apparent exception to this rule, making the person receiving the services liable for them—is that of a person who requests the service for those whom he is under some legal obligation to support or care for, such as a husband, or the father of minor children.

The cases illustrative of these points would be instructive; one which I will cite occurred recently to a member of the profession in New York, and one which we are all probably familiar with, as most of the facts have been already published. In this case the doctor was not only sent for by the defendant, but repeatedly called by her in person for extra visits, when the bill amounting to $191 was rendered to the defendant, she being the adult sister, and head of the household, paying all the household expenses, servants, nurses, etc. There was no denial of the propriety of the bill when first presented, only a request for time in which to pay it, the defendant making some trivial excuse each time to the collector. When the case finally came to court the defense was that at the time the services was rendered, the defendant, the lessee of the house and mistress of the household, lacked six months of being twenty-one years of age, and was not responsible.

The defense of infancy was probably an afterthought. The decision of the court, however, was in favor of the defendant, though the judge expressed his regret that the law rendered impossible the collection of an admittedly just claim, stating that it was the physician's duty to ascertain very definitely in each case where a minor was treated that such adult guardian was not only of age, but also a resident of the state.

There was a case in Pennsylvania in which the request of a physician to render medical services was made by the father, he using the following words: "Doctor, you must come, I am afraid my son will die," and as a natural sequence the doctor sent the bill to the father, who refused to pay; hence the suit. When the case came up for trial it appeared by the testimony that the son was thirty-two years of age and in business for himself. The judge held that this request raised no implied promise on the part of the father to pay for the physician's services; in other words, the court held the rule to be the same as though the father was a perfect stranger. It was said a different principle would be very pernicious, as but very few would be willing to run the risk of calling in the aid of a physician, where the patient was a stranger, or of doubtful ability to pay.

While writing up this paper a case came under my observation, in which, in a recent action to recover for professional services rendered, it was held that one who requests a physician to render medical services to another, without revealing the fact that he acted as messenger, should be liable for the payment of such services. In this case it appears from the evidence that the defendant was a son of the patient (since deceased); called upon the doctor and said, "Doctor, I want you to come and attend my father." The doctor went promptly and rendered the services for which amount the suit was brought to recover from the defendant; the defendant claimed that it should be brought against the estate, and if the estate did not pay, he would see it paid, and it was on these facts that the court gave the plaintiff a verdict, which was appealed from; but, on reviewing the appeal, Justice McAdam said, "We think the testimony sufficient to warrant the findings, it being proven that the son acted on his own behalf and not as a messenger."

Again there are many conditions of professional life in which the medical man may become a defendant, either justly or falsely accused. Unavoidable deformities and disabilities remaining after the treatment of fractures and dislocations have been made the most frequent occasions for arraignment of the surgeon.

At various times and in different medical bodies this question of malpractice suits has elicited attention. In 1856 the Chairman on Surgery of the State of Ohio Medical Association stated that the subject of malpractice was at that time of more importance than any other connected with medicine and surgery, and we may safely say that evil is but little diminished at the present day.

To cite a case, Mr. J. C. B——, age forty-eight, then in good health, but corpulent, was injured by the upsetting of his wagon, falling off his box, as was believed, upon his thigh. He was carried into a hotel, and there attended to by two physicians. After a careful and complete examination, by measuring, etc., they concluded that Mr. B. had only received a severe bruise. He remained two weeks under their care and was taken home in a bed. Four weeks after the accident the doctors were again called in, as the leg was now said to be shortened and turned out. On examination they found the leg in the following

condition: Shortened an inch and a half; the toes turned out, and could not be turned in; the left heel corresponding to the hollow of the right foot; a bunch in the groin like the head of the femur. They decided that it was a dislocation of the head of the femur upon the pubes, and with pulleys properly adjusted and carefully operated upon, proceeded to attempt its reduction. After two or three minutes' extension and counter extension, a sound was heard, and a sensation felt by those who were assisting which resembled the sound and sensation usually produced when a dislocation is reduced. The patient was now released from the pulleys and made to get up. The limb was of its original length and in its natural position, and the tumor in the groin had disappeared. The patient was again laid upon the bed and dismissed as cured. It, however, appeared in the testimony that a few days afterwards it was again shortened and turned out, but it does not appear that these facts came to the knowledge of the defendants. It also appeared that the plaintiff did not get the use of his limb so as to be able to dispense with crutches or a cane for two years. The limb is now shortened an inch and a half and moderately turned over, but the motions of the joint are free and the patient walks with a very slight halt and without inconvenience.

About three years after this the doctors were sued, but, the jury having disagreed, it was again tried about seven months later. In the first trial the plaintiff charged that the limb was sound when the defendant took hold of it with the pulleys, and that they then fractured it through the neck and without the capsule. In the last trial this was not claimed, but it was alleged that the original accident was probably a fracture without the capsule, and without displacement; that when examined by the doctors a displacement had occured, and that the defendants were chargeable with criminal negligence or ignorance in not discovering that it was a fracture, and consequently for subjecting the plaintiff to the useless pain of extension with the pulleys, and in not applying subsequently a retentive apparatus, since, by this omission, the plaintiff had a shortened and crooked leg.

On the defense it was admitted that the original accident was a fracture, without displacement, but that it was within the capsule and near the head of the bone; that its being within the capsule, and near the head, could alone satisfactorily account for the bunch in the groin, which disappeared with the reduction, and for the slowness of the subsequent restoration of the limb. It was claimed, also, that the signs described by the witnesses were the ordinary signs of dislocation upon the pubes, and would be likely to deceive the most skilled surgeon; that several eminent surgeons had mistaken fractures of the thigh for dislocations; that the extension with the pulleys did him no permanent harm; that the subsequent treatment pursued by the patient in this case, viz., keeping his bed for a few days and getting about on crutches, would have been the proper treatment had the exact nature of the accident been known; and, finally, that the patient had as good a limb as can ordinarily be expected in this fracture, under the most skilful management.

The examination of the numerous witnesses having closed and the counsel having addressed the jury, the judge followed with a most pungent and impressive charge, in which the jury were instructed to disregard all mere appeals to their prejudices and especially to reject that counsel which would advise them to look upon the medical profession as an oppressive and aristocratic monopoly, and to decide the case upon the facts, as drawn from the witnesses upon the stand.

The jury retired and in a few minutes returned a verdict for the defendants.—Brooklyn M. J.

Repair of Muscle by Wire.

Lucas-Championniere contributes an article on his method of repairing ruptured muscles by means of wire in a manner very similar to that employed by him in fractures of the patella. A man, aged 50, was admitted to the Beaujon Hospital under his care with the following history: A long, heavy ladder, blown over by a gust of wind, struck the patient across the left thigh. Very shortly after there was extreme swelling of the part, but careful examination showed that there was no fracture. Notwithstanding this, there was complete inability to move the limb. In a fortnight's time it was possible to diagnose rupture of the triceps tendon above the patella, accompanied by considerable laceration of the muscle tissue, and there still remained considerable effusion of blood into the thigh. There was a marked hollow immediately above the patella, which became more evident on making any attempt to raise the limb, which attempt was always futile. It was easy to ascertain the absence of any fracture of the patella. Lucas-Championniere decided to operate, and found on cutting down that here remained only a short tongue of fibrous tissue representing the triceps tendon at its insertion to the patella; above, the muscle was irregularly torn and retracted. There was an opening into the synovial sac of the knee, and the articulation was filled with blood clot. The writer proceeded by inserting two silver wires into the patella and carrying them from there to the triceps tendon above, though he feared that the least traction would cause them to

tear away from the latter. The patient healed rapidly, but a month later after leaving the hospital he was taken with some kind of convulsive seizure, as the result of which there was a repetition of all the symptoms in the injured limb. Lucas-Championniere cut down on the knee a second time above the cicatrix of the former operation. He found that the silver wires had not cut the tissue, but having become untwisted they had given. With the view of avoiding repetition of this accident he devised the following proceeding: Above the level of the stump of torn triceps muscle and tendon he threaded a strong piece of silver wire perpendicularly to the muscular fibers in such a manner that it could not possibly give. Then two parallel pieces of silver wire were passed through the patella and drawn upward so as to pass over the first transvere wire. Thus by means of a bony base below and a metallic above, he was able to exert sufficient traction to bring the patella and the triceps tendon into approximation, these in their turn being sutured with catgut. To prevent any entanglement of the wires they were carefully doubled on themselves. Healing was rapid and the patient left the hospital in three weeks, but was seen again seven months after the operation, when it was found he could walk perfectly; extension of the limb was complete, there was no pain, and the knee presented no abnormal characters. On examination by the radiograph it was discovered that the silver wires were broken, from which fact the writer draws the following conclusions: That in suturing the muscle and tendon by a silver wire healing results by fibrous union brought about by means of the wire acting mechanically. Should it be necessary to keep the wires permanently in place it is better to employ platinum rather than silver.—Jour. de Med., April 25, 1898.

Personal.

Dr. George H. Stubbs, formerly of Atlanta, now of Birmingham, Ala., has been appointed oculist and aurist for the Southern Railway Company for the territory west of Atlanta.

Dr. C. R. Dickson of Toronto has been elected one of the provincial secretaries of the Canadian Medical Association, and Dr. Wyatt Johnston a member of the committee on by-laws.

Dr. Hugh M. Taylor was chairman of the publication committee and read a paper on "A Plea for Prompt Surgical Interference in Some Intra-Abdominal Injuries and Diseases," at the recent meeting of the Medical Society of Virginia.

Railway Miscellany.

Obituary.

James Bailey of Utica, N. Y., who was the first secretary of the Central Pacific, died at San Francisco, Cal., August 13.

E. E. Gibson, chief rate clerk of the general passenger department of the Missouri Pacific at St. Louis, died in Colorado, August 22.

Mrs. Charles L. Colby, widow of the late Charles L .Colby, ex-president of the Wisconcin Central, died in New York City, August 24.

John Lang of Corning, N. Y., first vice-president of the Fall Brook Railway, died at Block Island, August 22, at the age of 72 years.

Dexter Richards, who was the projector of the Concord & Claremont Railroad, died at Newport, N. H., August 7, at the age of 80 years.

Frank L. Everest, assistant claim agent of the Missouri Pacific, died at St. Louis, Mo., August 23, of Bright's disease. He was 39 years of age.

James S. Collins, who was president of the Detroit, Eel River & Illinois during its construction, died at Columbia City, Ind., August 22, at the age of 78 years.

Henry W. Hobson, general counsel of the Union Pacific, Denver & Gulf, died at a hospital at Troy, N. Y., August 12, from the effects on an operation for peritonitis.

Melvin I. Corbett, attorney for the coal department of the Delaware, Lackawanna & Western Railroad, and commissioner of deeds for New York and New Jersey, died at his residence in Scranton, N. Y., August 9, at the age of 49 years.

Charles A. Taylor, traffic manager of the Richmond, Fredericksburg & Potomac, who has been in poor health for several months past, died at Dagger's Springs, Va., August 10. He was born at Taylorsville, Va., February 22, 1847, and had been connected with the Richmond, Fredericksburg & Potomac road since February, 1873. His first position was local ticket agent at Richmond, and he was made general freight and ticket agent May 1, 1875, holding the latter position until he was appointed traffic manager, December 1, 1889.

Edward F. Richardson, general agent of the passenger department of the Chicago, Milwaukee & St. Paul, with headquarters at New York, died at his home on Long Island, August 12. He was born at East Medway, Mass., October 17, 1844, and entered railway service in 1867 as clerk in the freight depart-

ment of the Erie Railway. He remained with that road for five years, and from 1872 to 1882 was city passenger agent and general eastern passenger agent of the Chicago, Rock Island & Pacific. He was appointed general agent of the passenger department of the Chicago, Milwaukee & St. Paul at New York in 1882.

The Big Four and the Monon.

It is understood that the arrangements for the control of the Monon by the Big Four interests are practically completed. The mileage of the C., C., C. & St. L. proper is 1,838 miles. In addition, there are 396 miles (Peoria & Eastern, Peoria & Pekin Union, Kankakee & Seneca and Mount Gilead Short Line) of subsidiary corporations, the operation of which is controlled by the company, making the total mileage of what is known as the "Big Four system" 2,234 miles. The Chicago, Indianapolis & Louisville has 537 miles of line. The union of the two therefore would make a total of 2,771 miles. It is not necessary to say, however, that the most important part of the Monon as an auxiliary to the C., C., C. & St. L will not be any particular number of miles of line, but will be the direct connection with, and terminals in, the city of Chicago.

Rumor, however, regards the combination of these two properties as only a step toward a much larger consolidation; while that larger consolidation itself would be but a step in the still greater process of unification, or simplification, of the Vanderbilt-Morgan lines in the New York-Chicago territory. Before the acquisition of the Monon by the Big Four was discussed, the probability of a consolidation of the Big Four with the Chesapeake & Ohio, and perhaps also the C., H. & D., was matter of common gossip and the possibilities and scope of such a union of interests have already been canvassed in The Railway Age. The four properties together comprise the control of the following mileage:

	Miles.
C., C., C. & St. L system	2,234.19
C., I. & L. Ry	537.11
Chesapeake & Ohio Railway	1,360.40
Cincinnati, Hamilton & Dayton Ry	651.60
Total	4,783.30

Any statement as to the ultimate destiny of these properties—whether they are to be welded into one system under one management, or to what extent there will be an elimination of existing corporations—must at this time be pure conjecture. There is no doubt that the inclination of those in control of the Vanderbilt-Morgan interests is toward unification. There is also no doubt that that inclination can, and will, have its way to some extent and in due course of time. Conclusions now, however, can only be drawn by guesswork or by inference from the general logic of the situation. It is sufficient for the present that the tendency of the powers is strongly toward consolidation and that every consolidation which takes effect is likely to result in more economical operation and better service and to be to the public interest generally.

Newspaper Railway Items.

A writer in The Railway Age says:

I suspect that under the say-nothing-about-it policy of the Santa Fe road the local reporters have some little difficulty in getting fresh items concerning the equipment of that road. The following is an indication:

The latest additional improvement to the already well-equipped Santa Fe engines is a new mechanical device which has recently been invented by Superintendent of Machinery Player. It is an indicator of speed, pounds of steam in boiler and consumed, and also the amount of water which is on hand and used in steam. It is the first of its kind and is now undergoing a trial run on engine No. 50. This engine has recently been rebuilt and is especially adapted for the fast mail run, which makes the fastest time of any train on the Santa Fe system. It was formerly engine No. 108, which was considered one of the best engines on the road. It is fitted with all the latest improvements and has the new cylinder valves and air brakes on the tank and engine trucks. The new indicator is attached on the right side of the engine.

Curious to know about it myself, I wrote to Mr. Player. He replied courteously to the effect that he knew of nothing new in that line in use upon the road, and expressed a strong suspicion that what the reporter saw was a Crosby indicator.

Another item from the same source says that the Santa Fe has ordered material for "the largest locomotive ever built." The following is the description:

The engine will be built by the locomotive department of the Santa Fe shops in this city. Among its features will be a boiler built of 1-inch boiler steel, and cylinders whose dimensions will be 12 by 32 inches. It will have no "pops," as they will not be required. No fireman living would be able to build a fire that would create enough steam to burst the boiler of this mogul. The engine will have ten drivers, and it is estimated that it will be able to haul a third larger load than any engine the Santa Fe now has.

Of course, mogul engines with ten drivers

may not be anything of a curiosity to a Kansas newspaper man, but locomotive boilers of 1-inch steel without "pops" will prove a decided novelty to most railroad men. This would certainly prove a temporary solution of the difficulty occasioned by the waste of steam and consequently of coal from "popping-off," which has vexed many motive power officials in times past. I think it was Mr. G. W. Rhodes who figured that popping-off was equivalent to throwing from the tender a half-pound lump of coal every second. But I am curious to know what firm handles steel of sufficient tensile strength to make this kind of a boiler absolutely safe.

As for cylinders 12 by 32 inches, there is, of course, the objection that they might be mistaken for extended piston rods and cause some speculation as to where the steam actually performed its work. Mr. Player's explanation, however, seems to cover the situation. He says, "Some reporters are freaks."

Frank P. Sargent, grand master of the Brotherhood of Locomotive Firemen, makes the following statement: "During the 13 years that I have occupied my present position as grand master of the Brotherhood of Firemen the affairs of the order have never been more prosperous or harmonious. A perfect understanding exists among all the organizations, and the railroads are disposed to treat us with perfect fairness. The time of great railway strikes seems to have been done away with by the new principles of justice. Since then there have been 3,000 new members initiated into the brotherhood, the largest gain for a similar period in the history of the organization. We have now 27,000 members in 535 subdivisions, and our finances were never in better condition."

Relief Departments and the Brotherhoods.

The question of the relative advantages to employes of insurance in railway relief departments and in the brotherhoods or labor orders is one which is often discussed among railway men themselves, but less frequently in print. Sometimes, it is not necessary to say, the discussion has become acrimonious and much bad feeling has arisen in certain organizations against relief departments. It is unfortunate, because relief departments are unquestionably admirable in their intention; nor does there seem to be any sufficient evidence that any individual relief department is not conducted in a way worthy of that intention. On the other hand, the insurance feature is the vitalizing principle of the brotherhoods, by which they have done great good in directions which probably no other instrumentality would have reached.

The Bulletin of the United States Department of Labor for July contains a long and reasonably exhaustive article on the subject of "Brotherhood Relief and Insurance of Railway Employes," by Emory H. Johnson, in which an impartial effort is made to compare the advantages of the two forms of insurance. An exact comparison, Mr. Johnson says, is impossible, because of differences in the methods of the brotherhoods and the relief departments respectively, but the following table is given as the best comparison that can be made between two of the "largest, oldest and most typical" railway relief departments. and two of the "oldest and best developed brotherhoods:"

COST OF RELIEF AND INSURANCE IN RAILWAY RELIEF DEPARTMENTS AND IN THE BROTHERHOODS COMPARED.

Organization.	Total Annual Assessments.	Insurance secured by foregoing assessments.	Amounts paid per week for accident and sick relief.	Funeral payments.
Pennsylvania Railroad Voluntary Relief Department.	Upon members with a salary between $55 and $75 a month $27.00	Payable on death.....$750	Accident relief, $9 a week for 52 weeks; $4 50 thereafter. Sick relief, $7.20 a week for 52 weeks.	
Baltimore & Ohio Relief Department.	Upon members with a salary between $50 and $75 a month: Operating trains. .....$36.00 Others..... 27.00	Payable on death due to— Accident.....$1,500 Sickness..... 750	Accident relief, $9 a week for 26 weeks; $4.50 thereafter. Sick relief, $9 a week for 52 weeks.	
Order of Railway Conductors, West Philadelphia Division.	For insurance (average per $1,000 for five years, 1892-1896) .....$14.60 For weekly relief payments ..... 12.00 Total $26.60	Payable on death or total disability $1,000	Sick relief, $7 a week for 52 weeks; $3.50 thereafter.	On death of member, $50; on death of wife of member, $25.
Brotherhood of Locomotive Engineers, Cedar Rapids (Iowa) Division.	For insurance (average per $1.000 for three years, 1894-1896).....$15.61 For weekly relief payments (average for five years, 1892-1896)..... 6.90 Total $22.51	Payable on death or total disability $1,000	Accident or sick relief, $10.50 a week for 52 weeks.	

Mr. Johnson supplements the table with the following remarks:

The insurance secured by the assessments quoted in the table is not the same in all four

cases. The assessments securing an insurance claim of $1,000 are given for both brotherhoods. The insurance payments of the Baltimore & Ohio relief department seem much larger than the payments made by the three other organizations, but in reality they do not average over $1,000, because three-fourths of the payments are on account of deaths due to natural causes, and only one-fourth on account of deaths resulting from accidents. The Pennsylvania Railroad voluntary relief department makes a smaller insurance payment than the Baltimore & Ohio relief department does, but this is offset by the smaller asessments, the accident and sick relief afforded being about the same for each company. The insurance payments of the brotherhoods are made on death and total disability, whereas the railway departments pay insurance only on the death of the insured member. A part of the expenditures made by the brotherhoods for insurance payments covers claims which the railway departments classify as accident and sick benefits. In those divisions of the brotherhoods where local relief is provided for by the regulations of the organization, the members are assured of slightly more assistance than is to be secured by membership in the railway relief departments. The local benefits of these divisions are about the same as the accident and sick payments made by the railway departments, but the member of the brotherhood who becomes totally disabled as the result of any one of several causes receives the full amount of his insurance.

The railway relief departments have an advantage which the brotherhoods have not in the encouragement of a feeling of mutual interets and of co-operation between employer and employe; but against this Mr. Johnson balances the effect of the brotherhoods in enabling employes to unite and co-operate for their own economic good. He concludes:

The general conclusion to be drawn from the foregoing details of comparison is the rather negative one that the cost of securing equivalent amounts of insurance and relief is practically the same in the railway departments and in the brotherhoods, and that if membership in one organization is preferable to membership in the other, it is because of considerations other than cost. Whoever accords greater merit to one than to the other of the two plans of relief and insurance cannot justly condemn either. Both are beneficial institutions.

Novelties on a Russian Train.

The new Siberian train which has just been sent to St. Petersburg for inspection by the Czar contains some luxurious features which might astonish even the American traveler, accustomed to all the comforts and improvements afforded by the latest style of Pullman and Wagner coaches. The new train is made up of two coaches for second-class and one for first-class passengers, with dining and baggage cars. There are the comforts of a bathroom, with gymnastic apparatus, a library in several languages, a piano and selection of music, maps, guide books, albums of views, an ice cellar and an arrangement for boiling water in three minutes by means of steam. The train is fitted with plates indicating the next stopping station and the length of the stop if over five minutes.

A barber, who is also qualified to give medical assistance, and a superintendent, who speaks Russian, French, German and English, are among the other conveniences provided. The train is lighted inside and out by electricity, and electric cigar lighters are found in the dining car. A photographer's dark room has been fitted up in the second-class car in which plates can be changed and developed during the journey. Electric bells and portable electric reading lamps are in each compartment. The kitchen is equipped to furnish a hot dinner for a maximum of sixty people. Paper and envelopes will be supplied free at the buffet, where hot and cold drinks of all kinds can be had. There is no charge for the barber's services, but the price of a bath is about $1.50, and three hours' notice beforehand must be given. From Moscow to Irkutsk is six days' journey, and the charges for the trip under such luxurious circumstances are very moderate.

The Railway Building of the World.

In a special report to his government, the British consul at Stockholm, Sweden, says, on the subject of the railway development of the world: "It is estimated that during the period of 25 years, between 1870 and 1895, the length of railway lines in Great Britain and Ireland has increased by about 9,000 kilometers, in Russia by about 24,500 kilometers, in Germany by 27,624 kilometers, and in France by 22,486 kilometers, while in the United States the increase is more than 207,000 kilometers, i. e., nearly eight times as great as that of Germany, and 23 times as great as that of Great Britain and Ireland."

During the month of June the relief department of the Baltimore & Ohio disbursed $26,233.06 among 1,581 beneficiaries. Of this amount, $2,000 was for accidental deaths. $6,036.29 for accidental injuries, $785.41 for surgical expenses, $9,911.36 for natural sickness, and $7,500 for natural deaths. The general expenses of the department for the month were $4,175, and there was invested during the month the sum of $50,935.58.

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"FEVER" AND THE FEVER STATE.*

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Local Surgeon I. C. Railroad.

Before discussing the subject of fever in detail, I wish to take up the subject of animal heat, its production, its continuance and its regulation. This, of course, is not new to this audience, but having once been a school teacher, I believe in reviews. It will not hurt us to review our physiology, because unless we keep it fresh in our minds we cannot understand pathology.

I shall quote from and follow Huxley: A living, active man constantly exerts mechanical force, and among other things gives off heat. Heat is being constantly given off from the integument and from the air passages, and everything that passes from the body carries away with it in like manner a certain amount of heat. Furthermore, the surface of the body is much more exposed to cold than the interior. Nevertheless the temperature of the body is maintained very evenly, at all times and in all parts, within the range of two degrees on either side of 99° F. I shall refer to this matter of the range of temperature in health later on. This equalization of temperature referred to is the result of three conditions. The first, that heat is constantly being generated in the body; the second, that it is as constantly being distributed through the body; the third, that it is subject to incessant regulation.

Heat is generated whenever oxidation takes place, and hence whenever proteid substances or fats or amyloid matters are being converted into the more highly oxidized waste products—urea, carbonic acid and water—heat is necessarily evolved. But these processes are taking place in all parts of the body by which vital activity is manifested, and hence every capillary vessel and every extravascular islet is really a small fireplace in which heat is being evolved, in proportion to the activity of the chemical changes which are going on. The burning of these matters gives rise to an amount of heat which is as efficient as a fire to raise the blood to a temperature of about 100 degrees F., and this hot fluid, incessantly removed in all parts of the economy by the torrent of circulation, warms the body, as a house is warmed by a hot water apparatus. But as the vital activities of different parts of the body, and of the whole body, at different times are very different, and as some parts of the body are so situated as to lose their heat by radiation and conduction much more easily than others, the temperature of the body would be very unequal in its different parts, and at different times, were it not for the arrangements by which the heat is distributed and regulated.

Whatever oxidation occurs in a part raises the temperature of the blood which is in that part at the time to a proportional extent. But this blood is swiftly hurried away into other regions of the body and rapidly gives up its increased temperature to them. On the other hand the blood which is being carried to the vessels in the skin begins to have its temperature lowered by evaporation, etc., is hurried away before it has time to get thoroughly cooled into the deeper organs, and in them it becomes warm by contact, as well as by the oxidating processes in which it takes part.

Thus the blood vessels and their contents might be compared to a system of hot water pipes through which the warm water is kept circulating by a pump; while it is heated not by a great central boiler, as usual, but by a multitude of minute gas jets disposed along beneath the pipes, not evently, but more here and fewer there. It is obvious that however

*Read at the eleventh annual meeting I. A. R. S., Toronto, July, 1898.

much greater might be the heat applied to one part of the system of pipes than to another, the general temperature of the water would be even throughout, if it were kept moving with sufficient quickness by the pump. If such a system were entirely composed of closed pipes, the temperature of the water might be raised to any extent by the gas jets. On the other hand, it might be kept down to any required degree by causing a larger or smaller portion of the pipes to be wet with water which should be able to evaporate freely —as, for example, by wrapping them in wet cloths. And the greater the quantity of water thus evaporated, the lower would be the temperature of the whole apparatus.

Now, the regulation of the temperature of the human body is effected on this principle. The vessels are closed pipes, but a greater number of them are inclosed in the skin and in the mucous membrane of the air passages, which are, in a physical sense, wet cloths freely exposed to the air. It is the evaporation from these which exercises a more important influence than any other condition upon the regulation of the temperature of the blood, and consequently of the body. But as a further nicety of adjustment, the wetness of the regulator is itself determined by the state of the small vessels, inasmuch as exudation from these takes place more readily when the walls of the veins and arteries are relaxed and the blood distends them and the capillaries. But the condition of the walls of the vessels depends upon the nerves by which they are supplied, and it so happens that cold affects these nerves in such a manner as to give rise to contraction of the small vessels, while moderate warmth has the reverse effect.

Thus the supply of the blood to the surface is lessened, and loss of heat is thereby checked when the external temperature is low, while when the external temperature is high the supply of blood to the surface is increased, the fluid exuded from the vessels pours out by the sweat glands and the evaporation of this fluid checks the rise in the temperature of the superficial blood. Hence it is that, so long as the surface of the body perspires freely, and the air passages are abundantly moist, a man may remain with impunity for some time in an oven where meat is being cooked. The heat of the air is expanded in converting this superabundant perspiration into vapor, and the temperature of the man's blood is hardly raised.

We are now ready to take up the subject of unnatural heat or fever. I will give the technical definition of fever. It is a diseased state of the system marked by increased heat, acceleration of the pulse and a general derangement of the functions, including, usually, thirst and loss of appetite. Many diseases of which the fever is the most prominent symptom are denominated fevers, as typhoid fever and yellow fever.

I was surprised at the variation in temperature in health as given by both Prof. Huxley and Sydney Ringer. The latter says:

"During the day the temperature remains about 99 degrees, but toward evening it begins to fall, and generally reaches its minimum at midnight. At this point it remains steady during a few hours, and then begins to rise, reaching the maximum about 9 a. m. During the day, between 9 a. m. and 4 p. m., the healthy temperature is usually about 99 degrees; thus it may not be higher than 98 degrees, or it may rise to 99.5 degrees Fah. Any rise above 99.5 constitutes fever. About four in the afternoon the evening fall begins, and at midnight the temperature is about 97 degrees, or even 96 degrees. In persons under 25 the daily variation is 2 degrees Far., while the variation in persons over 40 is more restricted, being often only 1 degree, or even less.

These variations have been found to be greater in persons while at work than in persons at rest. Then if a temperature rises above 99.5 we have a diseased state, and we say the patient has fever. An over-production of heat in the body, either by over ingestion of heat producing food or by over oxidation of the same, will cause fever. Such cases often occur, and are quickly relieved by an emetic or a physic. It is best always to try to remove anything that seems to be causing offense to the system. Often do we see children with but the one symptom, that of fever, and if the course I have suggested is followed we will usually make but one visit. A faulty elimination of the waste products of oxidation will cause a fever to arise. We may have the sweat glands closed, as usually occurs in a cold, and we have a fever. The indication

in such a case is to open the pores to make the patient sweat. When you restore the elimination your fever disappears.

There is still another method of having a fever produced, and that is by a failure of the regulating apparatus to work, i. e., a failure of the vaso-motor nerves to do their work, allowing congestions to occur, with consequent inflammations. These are the cases which are quickly relieved by medicines that restore the nervous equilibrium, such as aconite, gelsemium, veratrum, and antipyrine. In the foregoing conditions the fever is usually of short duration and easily amenable to treatment. There are yet the specific fevers, fevers that are caused by a specific germ in the blood and inflammation. It is unnecessary to mention all the fevers that come under this head. A

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few will suffice—small-pox, measles, scarlatina, typhoid fever, pneumonia and surgical fever.

We have seen by our definition that fever is always accompanied by an accéleration of the pulse. It is claimed that nature tries, by hurrying the circulation, to increase eliminaiton and thereby cast off the poison. I fear if we should try to assist nature along this line we would assist the undertaker. My own experience and that of others teaches me that by slowing the current of blood we may break up the fever. I believe it is impossible to get enough of a germicide into the blood to destroy the germ without destroying the life of the patient. I believe in using intestinal antiseptics in typhoid fever and in infantile derangements of the alimentary canal, but these may be considered as local, although administered internally. Give a heart sedative and at the same time eliminate and you may break up your fever. I am sure I have aborted pneumonia during the stage of engorgement by arterial sedatives and the application of heat over the lung. We cannot explain how slowing the blood current will stop fever. It may be that the mere slowing of the blood reduces the temperature and the germ dies in the lower temperature of the blood.

Fever is not a disease, but a symptom of disease. It is reasonable to my mind, the faster the blood flows the more rapidly cellular changes will take place in the body and this again causes a further rise in temperature.

Where is the fallacy in using arterial sedatives? I was taught in college it was dangerous to use them, that the heart was doing the best it could, why hamper it still further? At the same time my father was using these same sedatives every day in his practice, and his fever patients recovered more quickly than those who did not receive such treatment.

This advice to use sedatives must be cautiously given, for there are many times contra-indications against their use. A weak heart is always a sign against their use. A weak heart is also a contra-indication against the use of any antipyretics. Even the use of cold water will often increase this weakness.

Cold water in coils or by bathing is highly recommended by many, but I confess I am afraid of its use. My experience has often been that in applying cold I cause internal congestion and a chill to my patient.

A high fever, viz., 105 and above, if continuous, is very dangerous to life. In such cases I use cold bathing. It will bring down the temperature, but it very quickly returns again. If we keep on with our cold, the patient finally shows weakness and signs of heart failure, just as he does with heart sedations if they are continued. Hence I come to the conclusion that if we cannot accomplish the desired result, i. e., reduction of temperature by these febrifuge medicines, we cannot do so by any other means and also preserve our patient. It is not my purpose to talk about the special treatment of any specific disease.

The old theory of inflammation is no longer taught. Let us see how it used to be. Irritation, stimulation, congestion, exudation. These things all still occur, but the thorn in

the flesh is no longer considered the true cause. Metchnikoff has made researches that throw new light on the subject of inflammation. His position is that inflammation is a symptom of irritation of some sort. With the advance of our knowledge has gradually come the belief that practically all forms of true inflammation are the result of the activity of bacteria, and this belief has gone so far as to permit Gerster to make the assertion which, however, is not quite correct (Ernst), that bacteria are necessary for the production of all inflammations.

An injury occurs, as a bruise, cut or burn, which devitalizes the part, and this forms a pabulum for micrococci. Cohnheim says that inflammation is the excitation and consequence of a molecular alteration in the vessel walls. By this alteration adhesion between the vessel wall and the blood, and by consequence friction is increased, the result being the retardation of the blood stream in the inflamed district, while the permeability of the walls is augmented by the molecular change, and this results in an increased transudation of the albuminous contents, as well as in the admixture of colorless and red corpuscles with the transuded fluid. He considers the causes of inflammation to be every agency by which the chemical construction of the vessel walls is at all altered, and which, on the other hand, is not so powerful as to bring about the death of the vessels, and these causes may be classed under three principal heads, as traumatic, toxic and infective.

Thus we see the injury to the vessel walls may cause the inflammation, and if this proceeds to destruction of the tissues bacteria will further increase the condition, and infection of the whole system may follow.

These inflammations are always accompanied by fever and the fever only subsides with the subsidence of the inflammation. We may, if we begin early enough, abort an inflammation by the use of arterial sedations and local applications. We may put the patient in such a condition that these bacteria become inert.

A man in robust health comes home on a warm day, strips off all his clothing and lies down to cool off. He goes to sleep and in the meantime the weather changes and he wakes up chilled, and is taken immediately sick with peritonitis and dies in five days. It would look as though he died from a cold, but the explanation in this: the body always gives a home to germs or bacteria which are only waiting for an opportunity to get in their work. In this case the cold lowers the vitality to such an extent that the bacteria go to work. This case is really similar to a fever following a wound, although a little more difficult to trace the method of infection.

In railroad injuries the only wonder is that we do not always have infection. I cannot take time to discuss matter of treatment of inflammation, except to generalize. Direct the treatment to the wound or the seat of the inflammation. Hot moist applications relieve the stasis of blood, also relieve the tension, and with it the pain. Also use antiseptics in the applications to the affected parts. And if fever runs high use febrifuges and internal antiseptics, and I consider quinine and iron in large doses the best.

DISCUSSION ON DR. VANDERVORT'S PAPER.

Dr. William E. Guthrie of Bloomington. Ill.: I shall not undertake to fully discuss this excellent paper, nor shall I say anything about the doctor's explanation of the production and regulation of animal heat, but I want to say a few words with reference to fever. I am not much of a believer in medicines for the treatment of fever. It is a good plan for the physician to find out the cause of the fever, and, having done so, remove it. There is a disposition on the part of nature to heal an injury, to cure a disease, and all we need to do is to get rid of that feature which is keeping up irritation. Support the powers of the patient, and he will recover. We treat many cases with arterial sedatives and stimulants, the patients get well and we say we have cured them. We treat several patients, they get well, and we lay that down as a basis of treatment. I have an illustration in my mind now that may clarify this somewhat.

In the neighborhood where I live there is a sharp turn in the railroad. At the turn is a house, and in and around this house there lives a faithful dog. Every time the train approaches the house the dog runs out, barks at the train, scares it away, as it were, then goes back to the house, wagging his tail, as much as to say, "I have saved the house." The dog has done that for many years. The house is

still there; it worked in every case. Therefore, all the rest of you try and bark at the train when the train goes along your way. I think this is a fair illustration of what we do in many cases of disease.

As surgeons we should find out the cause of the irritation, and we cannot remove it unless we find it. We are called upon to treat a patient who has received a wound in a railroad accident, or by being caught in machinery. In a short time the patient begins to have fever, and we know there is something present in the wound which is producing irritation. Remove the factor which is producing the irritation, then let the wound alone, support the patient, and very soon he will be relieved. But in some cases we may have a higher grade of fever; we have a chill; we know then septic infection is going on. In such cases it is not enough to give medicines to allay fever, but we should open the cavity of the wound, remove the cause of the disease and support the patient in the meantime. If I were going to lay down a general proposition in medicine and surgery, it would be to give no medicine to reduce fever, but support the patient, and remove the cause.

Dr. J. E. Epperson of Kansas, Ill.: I must take issue with the author of the paper regarding the point that we always have an accelerated pulse in typhoid fever, and I will relate a case that came under my care some eight or nine years ago during an epidemic of this disease. The pulse for two weeks, or nearly that time, could not be kept above 60, even with the use of stimulants, while the evening temperature varied from 103 to 104 degrees. An old physician who lived in the neighborhood, and had partially retired from practice, saw the case one evening with me, and it happened that he had never used a thermometer. When he went to the bedside and took the patient's pulse he shook his head and told the man he did not have typhoid fever, and as a result of this statement I came very near losing not only the practice of that family, but of other families in the neighborhood. I had a short conversation with the doctor afterward, and after a few days he went and smoothed the matter over with the family and I did not lose my professional prestige. If he had not done that I am sure I would be a great many dollars out of pocket to-day.

Q.: Do you know anything about the normal condition of the man's pulse prior to the attack of typhoid fever, or afterward.

Dr. Epperson: I took his pulse on two different occasions, when he was in normal health, and at one time it was 65 and another 70. Possibly at the time it was 70 he was laboring under a little excitement.

Dr. Vandervort (closing the discussion): So far as our experience and observation in the practice of medicine go, there are always exceptions to all cases.

THE DEMAND FOR A FEW SIMPLE PRINCIPLES IN THE PRACTICE OF MODERN SURGERY, EMBRACING A VIEW OF SURGICAL GANGRENE, WITH REPORT OF A CASE.*

By G. W. Hiett, M. D., Pittsburg, Pa.
Ex-Surgeon P., C., C. & St. Louis Ry.

There is no certain guide for the surgeon in many cases of severe injury of a limb to the correct determination of what surgical procedure shall be instituted. The availability of the mutilated and torn tissue for the purpose of repair of a seriously injured limb is difficult in the extreme to determine. A diagnosis of the nature and extent of the injury and the general condition of the patient is made, we jump into the darkness and guess at the rest of it. The main artery we observe pulsates fairly; the distal portion is cold, but not lifeless. How do you know that an attempt should be made to save it? Are you certain that if undertaken you will not meet with dismal failure, not only in losing the distal portion of the limb, but also a little later the life of the patient? The most gifted surgeon of the present day fails on these occasions in entirely too large a percentage of cases. He delays and thus destroys; or, on the other hand, he destroys what delay perchance might cure. Why is there no rule formulated whereby the rank and file of practitioners of medicine and surgery can know at once what surgical proceeding to adopt?

Aseptic and antiseptic surgery now make this nearly but not quite possible, i. e., the extremely hopeful surgeon, with the aid of

*Read by title at the eleventh annual meeting I. A. R S., Toronto, 1898.

this valuable adjunct to practice, will boldly claim that the attempt to save the part should be made in all cases. Shall any of us contend that he is not almost correct? With the aid of antiseptics and other means, certainly very great achievement has resulted to the mortification of the leading surgeon of the town or city, who, perchance, has been the consultant and whose judgment has been set aside by the lesser attending surgeon, or by the patient himself in his positive refusal to undergo operation. The great diversity of opinion among the members of the profession on this point has led the writer to inquire into this subject, and, if possible, suggest something that may be of use to his fellow practitioners and lead ultimately to the formulation of a fixed principle easy of comprehension and quite as definite in its application.

Personally, with only a limited experience in the practice of surgery and an ordinary native judgment and surgical attainment, I have been so vexed when put fact to face with the above trying cases that I have wondered why I had not been better taught at college or in the years since learned somehow to master this very important question, which all must admit leads to so much stupendous blundering every day we practice upon this victim or that. Hit or miss and let it go at that. If our fellow mortal remain with us a while it is of course due to our splendid surgical achievement in his behalf; if he die it is probably due to—well, lack of vitality or shock or gangrene, etc., at any rate the surgeon is not to blame, because, not having any well established rule or principle to guide him, he, of course, could not be expected to do any better, and consolation comes at last when by a bit of will power he dismisses the whole unpleasant business from his mind, at least till the next time.

Just like what transpires in many other pursuits in life, because in the evolution of all science there is much that is as yet unscientific, beyond which we must at times jump and then go ahead, because in the determining of all methods and laws the process is essentially misleading and its progress remarkably slow to the finite mind, because of the absence of the living principle which, standing alone, groups and systematizes the confusing by-paths and points to the safe and open way.

When this great law or principle shall be grown to maturity, then this spot on the page of surgical science will be illumined, so that even the way-faring surgeon may, by its quick application, bestow upon his fellow mortal that rich beneficence which is now his to enjoy as the ripe fruit, marking an epoch in surgical teaching; then, also, will the surgeon of the future not only wash his hands well, but will adopt the plan of using them more and his knife and saw (always aseptic, of course) to better advantage in conserving the welfare of his patient.

To establish this principle in surgical practice we must anticipate what follows; only too often, when an attempt is made to save a shattered limb, viz., gangrene, a very common primary cause of death in these cases. What is this abnormal state? How can it be avoided or at least recognized sufficiently early so that operative means may save the life of the patient? The bacteriologists have studied the different processes leading, step by step, up to this gravely diseased condition of a tissue. The germ or germs have been practically discovered, and isolated almost as the specific microbe of the gangrenous state. The scientific advancement made by the study of the part played by these minute yet, conjointly, powerful organisms, which by their tremendous aggregation suffice in twelve hours' time to almost seize victory from defeat—and only too often a very easy victory—and cast forever upon a desolate shore "The human form divine." This advancement, I say, of the bacteriologist and chemist seems to me to far exceed that of the surgeon of the present day. The genius and judgment of the latter have made rapid strides and done much to meet the pressing demands of scientific surgery, but they come far short of singling out a definite principle, the practice of which must ever constitute the keystone of the arch in the art of surgery in these cases. Without such a principle we grope about in the darkness of empirical surgery and share, of course, the common fate of such a practice.

The science of surgery must ever anticipate the art, which latter is in reality, or at least should be, only the correct application of the laws of the former. For the sake of our art do we build up the science of surgery. For the sake of our art, also, as well as for general

use in the economy of creation, have bacteriology, chemistry, biology and physiology become splendid sciences from which the successful surgeon of our time must gather fresh material for the building up of his own science before he can hope successfully to practice his art.

To present this subject of gangrene in a tangible light and indicate the necessity of prompt action lest the patient perish quickly, I can do little better than recite a single case which so riveted my attention and produced in me such profound impressions that I then and there determined to give this matter my special attention at the earliest opportunity.

John H. B., aged 32, with powerful development of bones and muscles, had his left leg caught just below the knee between the coupler of a car and the engine, on October 7, 1897. He was brought to the West Penn Hospital suffering with a compound fracture of both bones of the leg. The calf was pulpy, as discovered by my making a free incision into it, though at first only a very small opening through the skin at seat of fracture presented. The foot was not altogether cold and the larger arteries pulsated well. It was decided to make an attempt to save the limb, notwithstanding I had seen death result in more than one case with similar injuries by attempts to save the injured member. Free incisions were made into the skin and a large counter opening was made posteriorly for drainage and the entire wounds repeatedly washed out with bichloride solution and dressed with the best antiseptic precautions. Applied external heat to limb and gave hot liquid nourishment. It was 9 p. m. Patient was seen again at 10 a. m. next day. The temperature was 100 degrees, pulse good. The dressings were removed, the foot was warm and its main artery pulsated well. We were fairly satisfied with patient's condition. He was seen next day at 10 a. m., just thirty-six hours after his injury, his temperature being 102 degrees, pulse 110 degrees. Removal of dressings disclosed small specks of gangrene here and there about the foot; the foot was apparently warm but no pulsation could be detected.

It was decided that amputation was necessary and should be done at once. Unfortunately for our patient the hospital facilities were taxed to the utmost that morning—both operating rooms being in use and likewise all the resident staff engaged in assisting with other operations, and as it was 1 p. m. before our turn came, it can be readily inferred the anxiety we suffered in behalf of our patient on account of this delay. During these three hours the spots of gangrene had doubled in size. As soon as we could secure the operating room and assistance, patient was anæsthetized, an Esmarch bandage applied reversely so as to drain the extravasated fluids of the limb downward, and the femoral artery was quickly seized and a hard roller bandage fixed over femoral artery by several turns of bandage. There were no spots of gangrene on the surface about the knee or above it, so it was decided to amputate in the lower third. Flaps were made and well retracted and the bone sawed. Examination of flaps disclosed tissues infiltrated with a yellow-green serum, and semicoagulated venous blood. The outer surface of the skin, however, at this point gave no indication of the state of affairs within. With such unwholesome diseased tissue for a stump I at once decided to go higher up, this time at the junction of the upper and middle thirds. The skin was normal here and of sufficiently wholesome appearance, but the subcutaneous fasciæ and muscles were still somewhat tainted. The latter were entirely removed on the same plane as the section of the bone. The whole interior surface of flaps was now scraped until (apparently at least) the tissues could be safely trusted for repair. The femoral artery was twisted and all the smaller vessels likewise, but a general oozing from the whole wound was encouraged for some moments. The wound was sewed up with silk. Drainage by a small rope of bichloride gauze, the stump was enveloped in bichloride gauze and absorbent cotton. Patient became very sick from the ether, and at 5 p. m., two hours and a half after operation, hypodermics of strychnia, gr. 1-30, were given every hour for seven hours, with hypodermics of whisky ℥ii every fifteen minutes for some hours; also whisky and beef tea per rectum: external heat; foot of bed elevated. Patient began to rest at 9 p. m. At 6:30 p. m. his pulse was 152, temperature 97 degrees, breathing 27 and shallow.

The following morning patient was much

better and continued so throughout his entire illness. The flaps healed by immediate union, and November 7, one month from the date of his injury, he was able to leave his bed and go about on crutches.

The lessons to be learned from this case are, first: The greatest watchfulness on the part of the surgeon is imperative when the patient has been given the benefit of a doubt and an attempt is made to save his limb. He should be seen at intervals of at least six hours instead of twelve and twenty-four hours, and on each occasion the injured parts carefully examined and the entire aspect of the case noted, so that at the first warning of commencing gangrene amputation may then be performed promptly. Second: In this particular case amputation should have been performed when the patient was brought into the hospital, but in accordance with a rule, which we shall formulate later, the merits of this case at the time of our diagnosis were such as to favor a trial at saving the limb. Third: Had the injuries been near the body instead of below the knee, and of the same grave character, an amputation should have been done at once, doubtless because there would be no sufficient margin of sound tissue between the injury and the body with which to make a race with gangrene, once it got started. Fourth: Where the soft tissues are extensively mutilated, whether the bones be broken or not, and although the main artery be pulsating, there is always grave doubt of the propriety of undertaking to save the limb, and if it is undertaken it should be watched at short intervals so as to anticipate the coming danger and thus insure the patient's safety by operation or otherwise. Fifth: The shock occasioned by a second amputation, together with the depressing effects of the ether, seemed destined for a considerable time to cause a fatal termination. We certainly thought sufficiently sound tissues would be found at the seat of our first amputation.

Lastly, I may state as a general proposition, which is also aptly suggested by this case, that aside from the possibility of the speedy development of gangrene and its quick absorption into the blood of the injured section, there is also a question in physics for us to solve in our consideration of the return circulation through the veins; many of these are distended, others torn to such a degree that infiltration from them into adjacent structures rapidly obtains, until every avenue in the return circulatory process is blocked, and apparently causing, if there were no infective bacteria generated, the speedy death of the part. There are not enough veins left intact to receive and transmit the volume of blood sent through the arteries, stretching the stagnant capillaries, becoming more and more congested till the current stops and the part is dead. This physical cause of obstruction to the return circulation is entirely independent of the results of thrombosis and embolism so minutely described by the pathological anatomist. The intensity of this purely physical process is none the less abated by the fact that all the nerve currents of the normal limb are now cut off through severing of the nerve trunks by the injury and later by pressure. Likewise the destruction of the lymphatic system of the part adds also to the potency of the same principle.

In conclusion I need scarcely add that the sweeping law of the older surgeons to wait for the line of demarcation was deliberately violated and amputation at once resorted to, with the result described. And this brings us now to a most important branch of our subject, that of delay in these cases.

The serious obstacles and distressing conditions which confronted the surgeons of a generation or more ago do not obtain now, since pathology has become so enriched that the clinician, with his aspetic and antiseptic methods and other manifold resources, finds himself little inclined to await for this disease or that to run its course before lifting a hand to stay or destroy it. As well might septicæmia, pyæmia, lockjaw and erysipelas go unattended as sequelæ of acute injuries. The enlightened modern surgeon, be it said to his praise, believes distinctly in prevention first. Don't let your patient get gangrene, at least don't let him get it much. "For if you do, your're sure to rue, and find it hard to break." In this particular form of gangrene at any rate don't solace yourself by waiting for the line of demarcation; it's asking too much of your patient. He can't afford it, and even if undertaken he seldom lives to complete the task. (He is a capable surgeon who can save a limb or member. He is more capable if he

can save the trunk or body. He is a most capable surgeon indeed if he preserve both body and limb.)

The object of this paper is to indicate to you the present demand for a few principles in surgical science that shall be in touch with all that is positively and definitely known in all the other correlated sciences. From these sources must come all those gems of truth which constitute the principles of scientific surgery. The clinical surgeon needs these principles for the better unbuilding of his art more to-day than ever before. He has them already, and is fast claiming more for the honor of his calling and the good of his kind. Neither the science nor art of surgery is at fault so much as the poor mortal who attempts to practice it. The material from which surgeons are made, too often perhaps, might better be used for other purposes. I believe pre-eminently in the saying of Darwin: "Men are born, not made. Education and training count for something, but blood tells." There are few Agnews in our own generation; his chapter on Amputations of nearly one hundred pages is certainly a great product of a greater mind. It is classic. But its application scarcely finds a place in modern surgery, owing to the splendid achievements of bacteriology. But so it will always be. We shall have the strong and the weak in all callings. Therefore I wish to present my petition for the simplest and best up-to-date practice in the treatment of acute or recent injuries. Please, I say, let it be simple and easy of application, so that the small surgeon—if there be any such—as well as the great surgeon, may feel quite at home with his art. Surgical decision, or the science of surgical procedure, or the science of discriminating surgery, or, if you please, the science of executive surgery, should constitute a distinct chapter in surgical text-books.

REPORT OF CASES.*

By D. A. Stewart, M. D., Winona, Minn.

I desire to present to your attention this afternoon two or three cases of unskillful surgery with results which to-day, with our new and modern aseptic environment and advantages, would, to say the least, hardly be expected:

Case No. 1: In the year 1872, while visiting a patient about twelve miles from my office, I was hurriedly summoned about four or five miles further back in the bluffs to the home of a French and Indian half-breed. When I arrived at the place I found an accident had occurred in the following manner: A boy about sixteen years of age had been hunting, and in running down the bluff he caught his foot and fell. The gun was on his shoulder with the muzzle in front of him, but when he fell the gun was reversed, with the muzzle pointing toward him, and the gun exploded. It completely carried away all of the integument and a part of the joint of the left elbow. He was assisted home by a boy still younger, arriving there about six o'clock at night. When I reached the place he was lying upon a dirty, filthy bed that was thoroughly saturated with blood, his arm tied up with a piece of a rag and was suffering great pain. Aside from the injury to his elbow, the breast and shoulder of the left side were well filled with No. 4 shot.

Of course I was wholly unprepared with instruments or appliances of any kind to undertake a case of as much importance as the one that presented itself to me then. However, I saw that something had to be done immediately, and that something was nothing less than the amputation of the arm above the elbow. By this time it was dark; the house, a long, low log structure, was well filled with the dusky remnants of a fast disappearing race. I found, upon inquiry, that a carpenter's handsaw could be procured at a neighbor's, which I immediately sent for. I also improvised a tourniquet with the use of a clothesline and a piece of oak wood. I had with me, as usual, my pocket case, which contained a bistoury, with a blade about an inch and a half long. Fortunately, I also had a small bottle of chloroform. There was no gas in the house, no electric lights, not even a kerosense lamp to be had. They did, however, provide five or six tallow candles, which were held about the bedside by as many half breeds of all colors and shades. The scene, as I looked upon it then in the earlier years of my practice, presented a very weird appearance. The loss of blood had been very considerable. The pa-

*Read before fifth annual convention C., M. & St. P. Surgical Association.

tient was weak and still in great pain. I proceeded, as soon as I could get the instruments and dirty rags together, to amputate about two inches above the joint.

Before my arrival, I should have stated, the local physician, an old country practitioner (who said to me then that he had not seen an amputation for seventeen years), had been sent for and was there at the operation. He rendered me no assistance, however, except by his presence, which was a great moral support, as he sat behind the stove two-thirds drunk until the operation was over. Out of courtesy, I left the case in his care, and told him about the day that in all probability the stitches would be ready to be removed. I did not see the patient afterward until about six months had elapsed, when out of curiosity to see what kind of a job I had made of it, I stopped at the place one day when riding by. I then learned that the aforesaid presiding genius had not put in an appearance from the time of the operation until the present. I found that the wound healed rapidly without suppuration, the stitches were removed on the day I indicated by one of the neighbors and the boy got well.

Case No. 2: In the month of February, 1883, early one morning I was hastily summoned into the country, about 20 miles distant, to see a case of inflammation of the bowels, which the messenger informed me was past relief, and that the trip was bound to be a useless one, but nevertheless I was wanted. I therefore made all possible haste over roads piled high with a long winter's contribution of snow, and as rough as the proverbial sea, with back-breaking pitch holes. I arrived at the house about noon, where I found the attending physician, who gave me this history of the case. Just five days previous, to an hour, the patient, Mrs. M., about 55 years old, stepped to the back door to call her husband to dinner. The step or small platform was coated with ice, and as she turned to enter the house she slipped, but caught herself before striking the step, preventing an otherwise bad fall. Almost immediately after she entered the house she became faint, and soon discovered a sharp, severe pain in the right side of the abdomen, which rapidly increased in severity. Vomiting set in, and the symptoms so alarmed the family that a messenger was sent to the nearest village, ten miles' distant, for a doctor, who arrived before night and relieved her pain with a hypodermic, and after assuring them that she was all right, returned home. On the following morning the pains and vomiting reappeared. The doctor was again sent for and the patient was again made comfortable. And this was about the daily procedure until I arrived.

Having listened to the above history of the case up to that time, I was invited to the bedside, where I found the patient with all the symptoms of rapidly approaching death. Her own and the bed clothes were filthy with fecal matter, the stench in the room was almost unendurable, and I concluded that the messenger was right when he said the trip would be a useless one. Still, not being satisfied with the diagnosis, I proceeded to examine the abdomen, where I at once discovered a bunch on the right side about the size of a hen's egg. Of course, the explanation was at hand, and with it a most uncomfortable dilemma for myself. Notwithstanding, I took the doctor quietly aside and told him what I had found, supposing it would be a surprise to him. On the contrary, the surprise was my own, for he calmly informed me that he knew all about that bunch; that it was a hernia of long standing; that it had never given her any trouble and had nothing to do with the present condition, and in spite of all of the other alarming symptoms, he maintained this opinion until I convinced him with a hypodermic needle that we had on hand a case of strangulated hernia of five days' standing.

The situation was explained to the family, with the assurance that there was no possible hope for the patient unless by operation, and that her chance of recovery, even with the operation, were not equal to one out of a thousand, after so long a period of strangulation. To my surprise, after a short consultation between the members of the family, I was urgently requested to give them the benefit of that one remaining hope. Therefore, notwithstanding the fact that I was wholly unprepared for an operation of this importance, having nothing with me but a small bistoury and needle and silk thread belonging to a common pocket case, such as one usually carries, I concluded to operate, knowing that neither the patient nor my reputation would

suffer from the result, as she could do nothing worse than go on and die. Therefore, without any preparation, or any attempt whatever with asepsis, I cut down upon the gut, which I found black, and the upper surface of it so necrosed that it gave way as soon as I touched it. I then enlarged the ring to relieve the constriction, and at the same time give me more room to work, when a quantity of fecal matter poured out from the gut, the under side of which seemed to be fairly strong. Not daring to return the gut into the abdomen, I was compelled to establish an artificial anus by attaching either side of the open gut to the edges of the abdominal walls with silk thread, and then with one or two stitches in either end of the external wound, I applied a rag torn from an old cotton sheet, moistened with carbolized water, to the parts, and with instructions to the family as to when the dressing should be removed and reapplied, left it all to the tender mercies of the "destiny which shapes our ends, rough hew them as we may." On the third day after the operation I was again called to see the patient and learned that within two hours after my departure on the previous trip circulation commenced to improve, consciousness was again restored and a movement of the lower bowels occurred. The fecæs for the first few days all passed by the new route, which gradually became smaller with the healing of the wound, until before the end of the fourth week the wound was completely closed, the hernia was obliterated, the bowels moved without pain or inconvenience, and the patient is alive and in good health at the present time.

Case No. 3: In the winter of 1890, while I was spending a month for recreation in a little town in middle Alabama, I had noticed a negro walking about the streets on crutches with a peculiarly deformed leg. In his locomotion about the town he always carried the left leg (which was the deformed leg) across the right leg in front. The toe of the left leg was in line with the leg itself, the heel thoroughly contracted and drawn up almost to the calf of the leg; the knee was ankylosed and presented an appearance which I had never seen before. I asked the landlord of the hotel to explain why amputation of that useless and cumbersome leg had not been performed. I learned from him that the man had previously been a miner in the iron mines and that an avalanche of iron ore and rock and dirt had fallen on him while at work some three years before, crushing his leg to an extent that under ordinary circumstances would have demanded amputation, but the surgeon, who, by the way, was the surgeon employed by the mining company, had never made the amputation and had no instruments sufficient to perform the operation. I also asked the landlord if he thought the patient would like to have the leg amputated, and he said he would call him up and find out, which he did. After talking with him for a few minutes he expressed a strong desire to have the leg removed. He found considerable difficulty in securing a place where he could stay until he recovered from the operation. He finally, however, made arrangements with a relative of his—a Methodist preacher—to stay at his house. So by appointment I went, two days later to the house, accompanied by this same local physician, with a meager outfit of instruments. The house consisted of two rooms—the one, their living room, almost totally devoid of furniture, with an old-fashioned fireplace upon the outside of it; the other was a lean-to shed, which in this part of the country would be considered unfit to shelter even an animal. In one corner of the shed was the half of a side of a hog thrown upon a barrel; in the other corner of the shed a lot of old harnesses and collars that the preacher used on his mule. The whole place was as filthy and dirty as you can well imagine the home of a southern negro. I made the amputation above the knee, and when the operation was over I put the patient upon a board bed with two blankets only underneath him for bed clothes. I took the liberty of drawing upon the company that owned the mines for a few yards of cotton cloth, and left the man to be nursed and cared for by unskilled assistants. This case made a rapid recovery. The leg was completely healed inside of two weeks and the fellow went to his own little hut about three miles from the town upon his crutches.

Now, gentlemen, I am well aware that I am not giving you a scientific or skillful dissertation upon the methods of handling amputations, or of doing latter-day abdominal surgery. I only refer to these cases as a few in-

stances, along the line of a somewhat extensive practice, showing that sometimes our most unskillful and unscientific efforts meet with results equally as good and favorable as those which we expect and desire in these days on aneisepsis and asepsis. I am also aware that the history of these cases will not add to your professional information, nor would I recommend the procedure, surrounding or appliances to be used, unless by absolute compulsion.

DISCUSSION.

Dr. J. N. Warren, Sioux City, Ia.: I would like to ask if he means to say that the opening caused by the sloughing of the cut healed over entirely, or if it persisted?

A.: Well, sir, I did not see the case from the third day onward. The hernial sac, with the assistance of the skin, healed over that part of the cut that I cut out a small black and encysed part, and finally it healed over and she is alive and well to-day without any hernia.

Dr. A. I. Bouffleur, Chicago: I did not hear the paper and therefore do not understand what the conditions were definitely. From the points mentioned I should think it was a case of Littré's hernia, in which Meckel's diverticulum or a portion only of the wall has formed the hernia. The subject has created some discussion here, whether the condition ever occurs except where Meckel's diverticulum comes down into the sac. I know one instance where a portion only of the wall of the intestine was in a hernial sac, and it became necrotic. The lumen of the intestine is not necessarily wholly obstructed. That was the case here; it was quite likely a Littré's hernia, and that probably explains why the lumen was not interrupted.

Dr. E. O. Plumbe, Rock Valley, Ia.: When I was in the army I saw a man who was wounded with a conical minie ball, about midway between the umbilicus and pubes. The injury was pronounced fatal and the man was fixed up as well as the circumstances would permit and left to die. For I suppose a week or ten days, perhaps, a little longer, there came from the external wound a mixture of blood and pus and then it closed by granulation. The ball passed through the rectum four of five days after the injury. There was undoubtedly some injury to the intestine.

Celluloid Bandages.

Dr. Walravens advocates the substitution for plaster, starch, silicate, etc., of bandages stiffened with a solution of celluloid as recommended (Centralb. für Chirurg., 1896, No. 29) by Landerer and Kirsch, on account of their great lightness, solidity, elasticity, impermeability and durability. These bandages are not affected by urine, pus, etc., and can be washed. They can be molded by warmth. As to inflammability, the author says he has many times purposely thrown them on the stove, and has never known them catch fire, but simply melt. Naturally, if they are brought to a flame, they catch fire just as clothes do. As to the impermeability to perspiration, that is easily remedied by a few perforations, which do not interfere with the strength of the splint. The solution of celluloid is made by dissolving one part of celluloid in three parts of acetone. It should be thin enough to trickle from the spatula, and pure acetone is desirable as evaporating more quickly and giving a more homogeneous solution. The application is as follows: The part is firmly bound by layers of gauze bandage, to which the celluloid solution is then applied. A fresh bandage is next applied and in its turn is soaked with the solution, and so on until the desired thickness is attained. The author, however, prefers to soak his bandages first in the acetone and then in the celluloid. He then applies them to the part and paints one or two layers of celluloid solution thereon. The celluloid dissolves also in a mixture of alcohol and ether, but the results are not so satisfactory as those of the solution in acetone. The hands should be smeared with vaseline while handling the acetone.—N. Y. Med. Jour.

New Hospital Car.

A hospital car to cost $10,000 is being built for the Missouri, Kansas & Texas. It will be provided with a drug store and an operating room and will make regular trips over the system.

In wounds of the head always inspect the scalp carefully before applying a dressing. If parasites are present they may convey infection, and the irritation caused by their presence may cause the patient, especially if young, to disturb the dressings. If present, it is best to shave the head. If this is not permitted, kerosene will kill them very rapidly; after a thorough application of this, wash off with green soap and water, then with sterile water alone.—Int. J. Surg.

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ETHER PNEUMONIA.

Anders of Philadelphia, in an extensive article[1] on pneumonia occurring after ether, states that he has collected statistics of 12,842 etherizations, 30 of them followed by pneumonia, or a percentage of .23. Mertens, in a series of 180 cases of etherization, found no less than 15 affected with bronchitis and pneumonia, with 2 deaths ensuing. Dr. David Drummond of New Castle, England, read a paper at the last meeting of the British Medical Association[2], in which he claimed that deaths occurring after operation, and attributed to sepsis, were often due to pneumonia.

As regards the cause, Anders believes it is not due to exposure to cold, nor does he believe that infection takes place from the cone or mask. He shows that in hospitals, where a fresh sterilized towel is used each time, the per cent of pneumonias is as great as when fixed apparatuses are used. Lindemann[3] showed by actual experiment that inspiration pneumonia may occur in rabbits. He placed powdered carmine in the mouth and after etherization found the particles of powder in the trachea and bronchi. Anders believes this factor has some weight, for of the thirty cases some eight had a previous cold or cough, and it is probable that, mucus from the nose and throat being drawn into the trachea, predisposes to an attack of pneumonia. Neither sex nor age seem to be of any importance from an etiologic standpoint.

Lindemann, as a result of his experiments, believes the effect of ether inhalations to be twofold: 1, the pulmonary vessels lose their vascular tonus and then dilate; 2, the perviousness of the walls is increased with resulting œdema. The toxic effect of the ether on the blood vessels is followed by an exudation of lymph, which furnishes a good soil for bacterial growth. In one of Drummond's cases the narcosis lasted one hour; it was attended by severe fits of coughing. On the following day the temperature rose to 102 degrees and the next day there was dullness at the bases, which spread up; death ensued in a few days. At the necropsy the right lung presented intense engorgement, and œdema with consolidation below.

As far as the diagnosis is concerned, this is easy if the chest is examined, but if this is not done the symptoms are attributed to the wound. Hence, as Anders points out, sudden rise of temperature, particularly if it occur coincidently with a thoracic pain, no matter how slight, following an operation, necessitates a physical examination of the chest. Concerning the mortality the author says: "As stated, thirteen of the thirty cases proved fatal, a percentage of 43.3. Surely, if ether be responsible for these fatalities, even though indirectly, there is great likelihood that, when other ill consequences are considered, it is but little less dangerous to life than its rival, chloroform."

Drummond believes that previous pulmonary disease predisposes to the occurrence of pneumonia, but none of Anders' cases, so far as could be ascertained, had a previous attack

1. Univ. Med. Mag., August, 1898.
2. London Lancet, 1898, 355.
3. Centralb. f. Path., 1898, 11-12.

of pneumonia. Drummond believes, too, that the latter is more likely to arise after abdominal operations, but, as Anders explains, this is due to the greater length of such operations.

The prophylactic treatment is most important and Anders advises that the nasopharyngeal mucosa should be thoroughly cleansed before the operation, an antiseptic mouth wash should be used also, and a spray for the throat. The length of the narcosis should be as short as possible consistent with good work.

Translations.

Effects of Traumatism in the Aged.

Remy states that prolonged shock occurs somewhat frequently in old people after traumatism. He compares it to a general paralysis, developing in a few weeks. If the surgeon does not check the malady the medullary and bulbar centers are successively attacked. Another form of operative shock, which is also met with in old persons, is sudden death. It may come on a few minutes after the operation or in the first few days, without any warning. It generally manifests itself as syncope, sometimes as an apoplectic attack or an attack of dyspnœa.

The senile alterations in the central nervous system are the cause of these frequent accidents. The surgeon may take some precautions to guard the organs of his patients. Above all he should avoid chilling an old person who already has, on account of his age, a great tendency to algidity, for chilling brings on shock. Chloroform should be considered as a chilling agent, and in the aged its gravity is further augmented by the lessening of the respiratory surface, caused by senile involution. If general anæsthesia is used, warm drinks and cordials should be given after the patients revive. Drinks should never be withheld from old persons after an operation.

We may resort to the injection of warm artificial serum to warm up the patient, repair the loss of blood and the vital intra-cellular exchanges. The cerebral symptoms subside under the use of stimulating food and drink, but much ingenuity will be needed to excite a failing appetite; as a last resort we may use gavage (Rev. Int. Med. et Chir. Prat, 1898, 117).

Conservative Treatment in Severe Contused Wounds of the Hand and Fingers.

"Conservative" treatment gives excellent results in severe wounds of the hands, in a condition of early and complete disinfection. The sooner we intervene after the accident the more chance we will have to act on the tissues which are still little infected; an early cleansing destroys the microbic colonies in process of development. The disinfection must be thorough and anæsthesia must be resorted to if necessary. In this manner we can cleanse the bottom of the wounds, extract bony splinters, trim up the torn muscles, remove powder grains, burnt parts, etc.

In disinfecting the wounds Martin advises the use of warm water in preference to antiseptic solutions, which attack the already contused anatomical elements. Boiled water at 50 or 55 [122-131° F.] degrees has none of these inconveniences and possesses great advantages. Water at this temperature has the triple advantage of being hæmostatic, aseptic and of combatting the chilling so constant in traumatic shock.

These irrigations should be abundant, each recess of the wound should be freely irrigated with a strong jet which searches out the contused flesh, cleanses it and rids it of all infected material. These irrigations should be preceded by a cleansing with alcohol and ether, when the whole surrounding area is thus cleansed, the wound itself is cleansed with tampons wet with ether first, then with alcohol.

The wound thus disinfected and prepared is tamponed with iodoform gauze or sterilized gauze; the hand and forearm are wrapped in a thick layer of cotton. This first dressing is left in place four or five days, and changed every fourth day thereafter. The wounds heal without a sign of suppuration (Ibid, 1898, p. 188).

Wherever iodoform or any of the iodine compounds is applied as a dressing, the part should be inspected the next day, owing to the possibility of the occurrence of dermatitis. When the latter occurs it often gives rise to heightened temperature, and might lead to the belief that wound infection had taken place.—Int. J. Surg.

Extracts and Abstracts.

Nitrous Oxid as an Anæsthetic for Surgical Work.

By W. B. Brinsmade, M. D.

Nitrous oxid was first prepared by Priestly in 1772. It was investigated in 1800 by Sir Humphrey Davy and its use for surgical operations suggested by him. It was used in 1844 by Horace Wells, an American dentist, for surgical anæsthesia. Its use was revived in 1863 by Dr. Colton for the extraction of teeth.

Nitrous oxid is a colorless, transparent gas, with a peculiar sweetish taste and odor. It is wholly devoid of irritant properties. Liquefaction takes place under a pressure of thirty atmospheres. Manufacturers supply the gas in liquid form in iron or steel cylinders. Fifteen ounces of the liquid furnish about fifty gallons of the gas. It can be kept when in the liquid form for an indefinite time. It is to this substance as a surgical anæsthetic that I deside to call your attention. There is very little, that is new, to say, but I hope to show that nitrous oxid is the safest anæsthetic we have and that its use is especially indicated in many cases.

The subject for operation should be prepared as we are accustomed to prepare him for the administration of ether or chloroform. The patient may sit up in a chair or recline on a table. Everything should be loose about the chest and abdomen excepting for very short periods of anæsthesia. Special care should be taken that the apparatus is in order and that there is a sufficient supply of gas. A tongue forceps should always be at hand. We are so accustomed to the simplicity of ether and chloroform administration that these precautions seem worthy of mention. Neither morphin, atropin nor strychnia is at all necessary as a preliminary. The bag should be filled with gas and enough passed through the connecting pipe to drive the air out. The mask is then to be applied accurately to the patient's face, covering nose and mouth. Any mustache or beard should be wholly within the mask to prevent entrance of air. Allow the patient to breathe deeply three or four times into the mask, then turn on the gas. After a dozen respirations the breathing becomes deep and rapid. To and fro breathing dilutes the nitrous oxid and is not cleanly. To allow for this the stop-cock is arranged with a valve which allows the expired air to pass out, but prevents entrance of air at inspiration. The receiving bag is to be kept nearly full all through the administration, and to accomplish this there must be a constant current from the cylinder to the bag. It has been stated that difficulty in administering the gas is a bar to its general use. The writer has not found this to be so. After a little instruction from one of our prominent dentists and a practical illustration of his methods, I found myself able to use it. Two of the internes at St. John's Hospital have become adept in its use.

There are some persons who take the gas badly, just as there are some who take ether badly. This is true of alcoholics. The higher up in the intellectual scale the patient is the more readily does he take all anæsthetics.

Physiological effect is probably produced by the shutting off of oxygen from the circulation. Locally, nitrous oxid is anæsthetic to the skin by reason of its freezing quality. When the gas is inhaled there is a sweetish taste which is not disagreeable. When the gas is carefully administered the sensations are pleasant, there is a sense of warmth to the lips and a delicious numbness comes over the body. This stage lasts only ten to fifteen seconds, then respirations become more rapid and deep, there is a sense of fullness in the head and patient loses consciousness so quickly that he has no time to realize any definite sensations. In the second stage, which lasts about one minute, the patient lies perfectly quiet unless something is done to excite a reflex. He breathes freely and pulse-rate is slightly increased. Color becomes dusky or livid, and the patient looks very badly to one not accustomed to nitrous oxid. At the beginning of the third stage the patient may snore, the eylids twitch and separate and the ball of the eye rolls up; there is a slight convulsive movement of the facial, thoracic and abdominal muscles, then the arms and legs fall limp and the patient is anæsthetized ready for operation within one and one-quarter to one and three-quarters minutes from starting the anæsthetic. The mask may then be removed and there will be an available period of from forty-five to sixty-five seconds for operative procedure. The eyelids may not separate and the lid reflex cannot be depended upon as an indication of anæsthesia. Pupils are generally dilated, but may be contracted or remain unchanged. When it is desired to prolong the anæsthetic the mask is removed while the patient breathes air one or twice, and again applied until respirations become very shallow or color dark and sallow, when air is allowed again. This may be kept up for a very long time without danger to the patient, but not without alarming symptoms in some cases. If no air is allowed patient may stop breathing for some seconds, but the heart is not affected. When this happens the mask is to be removed and the tongue pulled forward and the patient will soon breathe. I believe it would be almost impossible to destroy life

with this agent except with intent. If the gas is carelessly given jactitation may occur, but only lasts a few moments in most cases. The atmosphere is the natural antidote for nitrous oxid and after the removal of the gas the patient soon becomes conscious. There may be slight nausea and light-headedness for a few moments. Vomiting very rarely occurs, excepting when gas is administered on a full stomach, and not often even then. There is no shock caused by this anæsthetic.

Dr. Hasbrook reported some years ago that he had used the gas 52,000 times, lasting, some one and one-quarter hours, some twenty to forty minutes, with no fatal case. There were alarming symptoms in some cases with old pleuritic adhesions.

Dr. Chas. Buchanan, in the Medical News for 1893, says that gas has been used for dilating sphincters, lancing felons and abscesses, injecting hydroceles, carcinoma of the lip, phimosis, compound comminuted fracture, lithotrity, lithotomy, tracheotomy, amputation of the breast, and always successfully.

Dr. Geo. R. Fowler reported in 1889 a case of laryngectomy lasting one hour and forty minutes, in which gas was administered by Dr. G. W. Brush of this city. There was absolutely no shock and patient would have walked from the operating room had she been allowed.

In a personal letter Dr. W. T. Bull tells me he has used the gas for a forty-minute operation and frequently for operations lasting five to ten minutes with satisfaction. He also tells me that he uses it frequently as a preliminary to ether. He has found trouble in its administration because of frequent changes in the interne staff at the New York Hospital and because the apparatus got out of order easily.

Dr. G. W. Brush in 1890 reported its use in amputation of the arm, thirty-five minutes; carcinoma of the lip, one hour and twenty minutes; lithotrity, one hour; lithotomy, thirty minutes; two cases of amputation of breast, one lasting twenty-five minutes, the other thirty minutes.

In the St. Bartholomew's Hospital reports the anæsthetics used have been:

	1896.	1895.	1894.	1893.
Chloroform	2,553	2,350	2,524	1,887
Nitrous oxid	1,507	1,682	1,516	1,001
Ether	242	981	1,420	824
Nitrous oxid and ether	1,150	701	17	75
Ether and chloroform	33			28
Total	5,485	5,714	5,477	3,813

If nitrous oxid is used in an institution where such careful work is done as at St. Bartholomew's Hospital in so large a proportion of cases, it would seem either that we in America are content with our own methods when better ones are at hand, or that the gas works better in London than here.

It has been used with great satisfaction at the Vanderbilt Clinic, Surgical Department, for short anæsthetics.

Dr. Mapp, who first instructed me in the use of this agent, tells me he has used it many thousand times with no fatal result, and hundreds of times for operations of some duration.

Drs. Marion Sims and Fessenden Otis both used the gas frequently and with satisfaction.

The writer has used the gas some fifty times, either operating himself or giving the gas while someone else operated. The operations have lasted from three to thirty-three minutes, and with one exception the anæsthesia has been satisfactory in every respect. This group of cases includes:

Curettage of uterus, two cases; one lasting twenty-five, the other fifteen minutes.

Skin-grafting, two cases; one twelve, the other sixteen minutes.

Resection of knee, thirty minutes.

Catheterization of ureters, twelve minutes.

Perineal section, eleven minutes.

Orchidectomy and incisions for large sloughing area, thirty-three minutes.

Exploratory laparotomy, ten minutes.

Metastatic abscess, twenty-two minutes. This case was of especial interest. The patient, a well-known surgeon of this city, had undergone two operations within a month, one under chloroform, the other under ether. Both times the vomiting had been so severe and persistent as to endanger his life. Under the nitrous oxid anæsthesia the operation was satisfactorily performed and within a half hour he was hungry for, and ate, his breakfast. The other operations were for inflammatory processes, phimosis, removal of foreign bodies, amputation of fingers, hypospadias, repair of cervix and perineum, sebaceous cysts, ingrowing toe-nails, removal of adenoids. I have not used the gas in obstetrics because chloroform is perfectly satisfactory.

Dangers and Mortality.—Nitrous oxid is an inert substance as far as the human organization is concerned. It acts as an asphyxiant by shutting out oxygen. No poison circulates in the system as do ether and chloroform. The natural antidote, the atmosphere, is always at hand and always working. The alarming symptoms may be in a degree avoided in several ways.

1. By admitting oxygen from time to time.
2. By using oxygen and N_2O gas, in varying proportions, each with its own cylinder and separate bag.
3. By using nitrous oxid pure and admitting

air from time to time. Practically, this is the way, and we always give it.

By alarming symptoms I refer to the color of the patient's face and extremities, and cessation of respiration. These do not alarm one accustomed to its use. When one realizes how generally this gas is used by dentists without much training and on patients who walk in from the street—how it is administered without any knowledge of the condition of the patient's kidneys, heart, lungs or blood vessels—it seems extraordinary that there should have been reported only 17 deaths from this substance during all the decades of its use. Of these 17 deaths, reported by the Lancet's commission on anæsthetics, some seem to me unjustly put in the list. Dr. H. C. Wood says that Dr. Buchanan is probably right when he put the mortality of nitrous oxid at 2 in 10,500,000. It is safer to take the gas than to cross any crowded thoroughfare.

In 1896 Professor Gurlt of Berlin showed that the statistics for five years gave:

One death in 2,909 chloroform narcotizations.

One death in 6,004 ether narcotizations.

One death in 5,745 Billroth's mixture narcotizations.

While I do not believe that we have any such mortality in America, we all recognize chloroform and ether to be dangerous agents, both in their immediate and secondary effects. On the point of mortality nitrous oxid is easily the best anæsthetic.

Contrast the choking sensation, the excited stage, the struggle, sometimes only overcome by the brute force of orderlies and nurses; the long time necessary to bring about anæsthesia under ether, with the quiet, peaceful sleep, produced in less than two minutes, by nitrous oxid.

Contrast the nausea and vomiting, the thirst and retching, the headache, and, most of all, the shock of ether, with the quiet waking into an almost immediate normal condition from nitrous oxid.

Contrast the organs affected by ether and chloroform—the heart, the lungs, the kidneys and the stomach—with these same organs absolutely not affected by nitrous oxid.

I do not compare chloroform with nitrous oxid because it is so much more dangerous an agent that we, in America, use it only when especially indicated. If these things are so why do we not use the gas more generally?

Disadvantages of N_2O as Compared with the Other Anæsthesias.—There are very few men practicing surgery to-day who are familiar enough with its actual use to teach the hospital internes the method of its administration. In fact, few of our hospitals are equipped with an apparatus, so that if one wants to use this agent he must send for a dentist to administer it. As far as I know, the use of N O is not taught in the colleges.

The apparatus is bulky and complicated as compared with that for ether.

It is much more expensive.

Muscular relaxation is not so complete as with the other anæsthetics, in some cases, but this need only imply a slight increase of annoyance to the operator. The dark color of the blood is somewhat of a bar to delicate dissection. Micturition occurred in one per cent of a series of 1,000 carefully recorded cases by Dr. Silk, and illusions in six cases in the same series. Opisthotonos occurs occasionally. An exacerbation of an old insanity is reported. Of course we must realize that nitrous oxid has been used largely for very short periods of anæsthesia and in comparing statistics this must be taken into account.

It has been said that children do not take the gas well. I have used it six times on children between seven and ten years of age, and had no difficulty.

Special Indications.—The gas has been used without disadvantage in cases of phthisis and apoplexy. It has been much used by Dr. Dudley Buxton, for Mr. Victor Horsley, in cases having epilepsy, without disadvantage.

Menstruation is no bar to its use; neither is pregnancy nor lactation. I should say that it was especially indicated in those old people whom we know for some undefinable reason will not take ether well. It seems also indicated in patients suffering from kidney disorders and sluggish circulation. It is especially indicated in cases of acute or chronic bronchitis.

I find no case of penumonia following its use reported.

In my experience it is more satisfactory both to patient and operator, in cases of inflammation requiring incision and drainage, than any of the local anæsthetics. The realization of what is going on and the sight of instruments and blood often cause more discomfort than the actual pain.

Nitrous oxid is not going to take the place of ether and chloroform. If for any reason the more common anæsthetics seem contraindicated, almost every operation can be performed under nitrous-oxid anæsthesia with safety to the patient, but it may be with an added annoyance to the operator.

My claim for this agent is that it is far superior to any of the local anæsthetics; that it is the best we have for all simple incisions, with drainage, and for all minor operations where absolute relaxation and fine dissection are not necessary. "The ideal anæsthetic is the one that produces anæsthesia and relaxation without trenching on the natural processes."

DISCUSSION.

Dr. J. S. Wight said that he was much pleased that this subject had been brought before the society. He had often thought that he would use nitrous oxid, but there was a way so much easier, and there was so much apparatus about this, that he had not done so. That certainly ought not to be an objection in a case of life and death. He had used it occasionally in short operations and he thinks the essayist well remarks that the patient looks badly while under the influence of the gas. It is unpleasant to see a patient get so black that you can hardly distinguish whether he is alive or not. Still, he knew of no fatal case resulting from its use.

He recalls a case in which he operated some twenty years ago in which Dr. Brush gave nitrous oxid. It was only a small, vascular growth over the scapula, but the patient did not become herself for two or three days and she vomited continually. He supposed that was an exceptional case.

He had operated upon a gentleman to remove a tumor of the right breast, and he elected the nitrous oxid. In that case he hurried the operation, because he thought the patient was going to die. The operation was finished in about nine minutes and he had the satisfaction of knowing that in a little while after the operation the patient got up and went downstairs to dinner.

Dr. Henry Wallace said that some years ago he assisted the late Dr. Rand at a case where the nitrous oxid gas was administered. It was an operation for hemorrhoids and fissure in ano. The anæsthetic so changed the color of the mucous membrane that the operation was rendered quite difficult. When the doctor had finished he remarked that he did not think he should ever use the gas again in this class of cases.

During his term of service as interne at the Long Island College Hospital he had used, with a great deal of satisfaction, Dr. Wight's ether inhaler, and found it especially adapted to the etherization of patients in the Sims' position, in which case the ordinary towel or Allis' inhaler is awkward of application.—Brooklyn Med. J.

Traumatic Bursitis of the Knee.

By N. C. Morse, M. D., Eldora, Ia.

Anatomists concur in the statement that a bursa consists of a thin wall of synovial membrane or connective tissue, forming a sac or pouch whose cavity contains synovial fluid, and that these bursæ are found placed between surfaces that move upon each other, their object being to diminish friction and afford protection to the integument or tendons of muscles, as they play over bony surfaces. It is the general belief or supposition that these brusæ, when located near a joint, communicate with the joint cavity, or that they are a continuation of, or but reflected portions of, the true synovial membrane of the joint proper, "hernia synovia," as Bryant calls them. The desire to demonstrate the fallacy of this belief is my apology for bringing this question before you.

According to Gray, the normal bursæ of the knee-joint are distributed as follows:

Anterior, 3....	1. The prepatellar (found between the integument or skin and the patella). 2. Between the upper part of the tuberosity of the tibia and the ligamentum patellæ. 3. Between the lower part of the tuberosity of the tibia and the integument, at or about the insertion of the ligamentum patellæ.
To these should be added....	1. One beneath the tendon of the quadriceps extensor, at or about its insertion to the upper and anterior surface of the patella. 2. The subcrureus bursa.
Upon the outer side, 4.....	1. One beneath the outer head of the gastrocnemius. 2. One above and 3. One beneath the external lateral ligament. 4. One beneath the tendon of the popliteus.
Inner and posterior surfaces, 5.....	1. One beneath the inner head of the gastrocnemius. 2. One beneath the insertion of the tendons of the sartorius, gracilis and semitendinosus. 3. One above and 4. One beneath the tendon of the semimembranosus. 5. One between the tendons of the semimembranosus and of the semitendinosus.

Of all these bursæ a very careful dissection of several different subjects has clearly demonstrated that only those located near the tendons of the gastrocnemius muscles and the one beneath the tendon of the popliteus, between it and the condyle of the femur, have any joint connection.

Gerster contends that the bursa of the quadriceps tendon is formed by a fold or ex-

tension of the synovial membrane into the suprapatellar space. In the revised Gray it is stated that sometimes there is a small opening between this bursa and the joint, but so far as I have been able to determine, the two are separate and distinct, the bursa being above and separated by a thin layer of fat and connective tissue.

Supernumerary bursæ may develop in places where the skin, fascia, muscles, etc., are subject to continual pressure and friction, particularly over bony prominences.—(Tillman.) They develop from the soft connective tissue and form by degrees into a complete sac with smooth walls and endothelum, and contain a mucoserous fluid.—(Hygroma.) Thus Gruber discovered eighteen in the parts round the knee, and Velpeau found fourteen bursæ on the dorsum of the hand.

Of the various named normal bursæ the prepatellar, the tibial, the quadriceps extensor, the posterior or popliteal, and the subcrureus are of special importance to the surgeon, as they are frequently involved in an acute or subacute form of inflammation depending upon trauma, occurring in football, baseball and other athletic performers as a result of forcible flexion, severe concussion, twisting or bruising of the limb, or the result of long-continued pressure and irritation upon the patellas, as noted and frequently seen in the housemaid's or devotional matron's knee. It is well to recollect, however, that anyone of these bursa may become the seat of inflammation, and a remembrance of their position will often enable us to explain many apparently mysterious and painful affections that occur in this locality, as well as prevent confusion in diagnosis.

Acute bursitis of the knee is always accompanied with more or less severe local and general symptoms, pain, heat, redness and swelling of the part or bursa involved, with general pyrexia. The pain in violent cases is often intense, usually with nocturnal exacerbations, in many cases the symptoms being identical with those of true synovitis or gonarthritis. Hence bursitis is not unfrequently mistaken for these affections; in fact, some of our writers refuse to recognize any distinction (Wyeth), while Bryant admits he was often puzzled over these cases, until he had read a valuable paper on this subject by Morrant Baker (St. Bartholomew's Hospital Report, 1887).

It is but fair to presume that 65 per cent of the so-called cases of trumatic synovitis of the knee are in reality cases of bursitis (by synovitis I desire to include gonarthritis, periarthritis, phlegmon, etc.), at least in their incipiency, although in neglected cases the inflammatory action may spread from simple continuity of tissue or bursting of the bursa to the surrounding tissues and finally involve the joint. The inflammation may resolve into a more or less consolidated tumor, terminate in suppuration, or assume a chronic form. The secretion of fluid into the sac is usually rapid, and the tumor becomes well defined, elastic, as well as painful to the touch, and if suppuration results we also have marked œdema locally with general systemic infection. It should be remembered that a normal bursa is capable of great distention, the prepatellar and quadriceps especially may contain as much as ten to thirty ounces of fluid.

Diagnosis.—American surgeons do not seem to agree upon this subject of bursitis for the reason they have failed to give the matter proper attention; hence we are indebted to our German brothers across the sea, Gruber, Tillman, Weigert, Neumann, etc., for much of our present knowledge of this distinct affection. "Bursitis acuta" ordinarily runs but a short, characteristic course. Where the fluid accumulates rapidly in the bursa, there is always heat, pain, soreness and swelling, with constitutional disturbance in proportion to the local manifestations. Not infrequently the pain is very acute, but after a few days the pain becomes less intense, the reverse of synovitis or arthritis, though the soreness and swelling will remain until restitution is fully established. In this class of cases, including the subacute and chronic forms, the diagnosis is comparatively easy, but in the more acute or violent cases it requires a very careful examination to prevent confusion, and an early recognition of a bursitis may save the patient much suffering and possibly prevent joint infection.

Where the prepatellar bursa is involved there is usually a well-marked, well-defined, fluctuating tumor, and if very much distended the patella cannot be felt except by deep pressure; in other words, the fluid is entirely anterior to or above the patella, the bone being in its normal position. Whereas in synovitis with effusion the patella is found floating or pushed forward from its normal position, for the reason that the fluid in true synovitis collects or forms between the trochlea or under surface of the patella and the joint, thus displacing the patella forward. Again, in synovitis, by Erichsen's method of grasping the front of the lower part of the thigh with the flat of the hand and laying the fingers and thumb alongside of the kneecap, the fluid, even in small quantities, may be made to bulge on either side of the ligament, or be forced back through the joint into the popliteal space.

Bursitis of the quadriceps extensor is distinguished from synovitis by being plainly limited to the anterior and upper surface of the leg, and fluctuation being above and not through the joint, the final test, which is ap-

plicable to all bursæ, being careful but firm pressure over the tumor, which, if there be any opening into the joint, will diminish in size corresponding in amount to the quantity of fluid displaced or forced into the joint. The large bursa which normally lies between the inner condyle of the femur and the head of the gastrocnemius muscle is more frequently enlarged than any other of the popliteal bursæ. Its origin is normally upon the inner side, under the long tendon of the biceps, but as the tumor increases in size it becomes central and pulsation of the popliteal artery may cause it to be mistaken for an aneurism. By slightly flexing the leg upon the thigh, an aneurism would became more defined, and its pulsations more marked. In bursæ the swelling becomes less distinct. Where the prepatellar bursa is inflamed and the sac becomes greatly distended, it not infrequently happens that the inflammation extends to the quadriceps extensor bursa, but unless there is a rupture of the sac the disease may remain isolated and the surrounding tissues remain free from infiltration or contamination.

Lastly, assuring ourselves there is no joint connection, the diagnosis is made positive by means of the introduction of the hypodermic or exploratory needle, examination in all doubtful cases being made under anæsthesia.

Medico-Legal Aspect.—Bursitis is of special interest from a medico-legal standpoint. By an error of diagnosis an injustice is often committed and a minor injury or a bursitis pronounced a grave or serious synovitis solely from the reason that the attending surgeon is not familiar with the anatomical fact of the presence of these bursæ or is not able to make a differential diagnosis. Just as traumatic bursitis is a very common occurrence, so, on the other hand, traumatic synovitis is very rare and a very large per cent of the so-called "cases of traumatic synovitis" are in fact due to gonorrheal infection or occur in patients of a rheumatic diathesis, and in this latter class of cases the synovitis or arthritis are often recurrent; hence a slight injury to a subject afflicted with a chronic rheumatic synovitis is very frequently taken advantage of by unscrupulous parties ever in search to plunder corporations. Recurrent attacks, especially with gouty symptoms, will prevent deception in many of these cases and a careful microscopical examination of the contents of a bursa will often determine its origin.

Report of Cases.—A report of the following cases, with drawings, photographs, etc., will, I trust, be of interest to you and better illustrate what I have attempted to demonstrate, viz., that we may have inflammation with suppuration and other evidence of phlegmon, infecting the various bursæ of the knee, without necessarily involving the joint:

Case I: Ossie J., aged 15, was brought to me August 21, 1895, for amputation of the leg. About three months before he had accidentally fallen upon a nail, which had penetrated the patella or kneecap of the left leg, in consequence of which, according to his attending physicians, a violent synovitis had developed, which, later becoming purulent, the general appearance of the limb and condition of the patient seemed to call for immediate amputation. The leg below the knee was somewhat cyanotic and œdematous, emaciation had been very rapid, and now so pronounced the mother was able to carry the young man in her arms into the office. The knee-joint was apparently enormously swollen, but upon a more careful examination the entire trouble was found to be confined to the upper and anterior part of the leg, the popliteal space not being affected. The swelling was so great the patella could not be felt, but a probe inserted through a discharging sinus revealed the presence of necrosed bone. An incision was made three or four inches in length immediately over and above the patella, which brought to light the fact that instead of a synovitis there had been an inflammation of the prepatellar bursa, with necrosis of the patella, the bursa of the quadriceps was also greatly distended with fluid. The diseased portion of the patella was removed, the quadriceps bursa opened and packed with gauze, the boy making a rapid and uneventful recovery, with a perfect leg, the knee-joint proper at no time having been affected.

Case II: G. R., tinner by trade, while at work laying a tin roof began to complain of a pain or soreness below and a little to the left of the tendon of the ligamentum patellæ at or about its insertion on the tibia. Continuing in his work, a swelling made its appearance in the course of a few days, which gradually developed to about the size of a goose egg. The limb now became quite painful and disqualified him from work. He was treated several weeks by the application of iodine, etc., without improvement, and having been told by his attending physician and friends that his leg was in a serious condition from leakage of "joint water," he applied to me for relief. This was a very pretty and typical case of simple bursitis. Under local anæsthesia the tumor was aspirated, after which fifteen minims of carbolic acid was injected. Full and complete recovery followed.

Case III: In November, 1896, I was called upon to appear as an expert in a case against the Iowa Central Railroad. The plaintiff claimed to have received an injury to his knee; a sudden jolt of the car having thrown him forward, he struck his knee over the patella. His attending physician testified that inflammation of the joint had developed as a result

of the injury, that the parts over the knee were greatly distended, so much so they were compelled to aspirate and had drawn off six or eight ounces of fluid. They stated further that the patella could not be felt, that at no time did the temperature exceed 101 degrees, and pain after forty-eight hours was not severe enough to require opiates. Careful inspection revealed a small scar directly over the patella, which the doctors admitted was the point of aspiration. The recovery was complete. This, gentlemen, was unquestionably a typical case of bursitis, the joint never having been involved.

Treatment.—Acute bursitis during the inflammatory or formative stage is best treated by rest, hot formentations of a saturated solution of boric acid or sulphate of zinc, and general anti-inflammatory treatment. Later, when effusion has occurred and we have a well-defined tumor, no matter where situated, or whether the case be acute or chronic, if absorption be retarded and convalescence unnecessarily prolonged, and where a moderate amount of pressure over the distended bursa assures us we have a closed sac, aspiration is not only safe, but hastens the cure, as well as affording comfort to the patient. In the more chronic cases it is customary with me to withdraw all fluid, after which fifteen to thirty minims of pure carbolic acid is injected, the bursa gently massaged and pressure made with adhesive straps. The results, without exception, have been satisfactory. When by long neglect, or other cause, the tumor has become hard or solid through the formation of fibroplastic cell exudation, "rice bodies," etc., an incision large enough to remove the entire contents should be made, followed by antiseptic irrigation and gauze drainage. In the more violent forms of inflammation, which usually result in suppuration, prompt aseptic incision or aspiration, with irrigation, etc., is the only rational procedure. In these days of aseptic surgery the patient can be more quickly and thoroughly relieved by an early incision than any other method, the relief being instantaneous and recovery rapid. The application of iodine, liniments, ointments or local sedatives is simply tampering with what may be a very serious trouble. It is therefore unwise to delay incision, or at least aspiration, for should the bursa rupture we will have infection of the joint and probably necrosis.—West. Med. Rev.

The Repair of Wounds of the Brain.

Tschistowitsch has studied the healing of aseptic wounds of the brain tissue of animals. He finds that in the process of healing and of filling up losses of substance, the connective tissue elements of the pia and of the blood vessels play the chief part. The neuroglia takes a very insignificant part in the process and that consisting only in the formation of a sclerotic zone about the cicatrix or foreign body when there has been long-continued irritation. He thinks it likely, by a more gradual destruction of the brain tissue than was possible in his experiments, this growth of the neuroglia may become relatively more extensive, as in progressive degenerative processes in brain disease.

No regeneration of nerve cells was observed. With regard to the regeneration of nerve fibers the author is in some doubt, but does not deny that it may occur. He found that the epithelium of the ventricles had little power of regeneration.—Bost. M. and S. Jour.

Two Cases of Successful Replacement of the Completely Severed Ear.

Dr. F. A. Purcell supplements a similar case reported by Dr. William J. Brown in the Lancet for June 4, with reports of two cases in which the completely severed ear was successfully replaced.

The same method of replacing the ears was adopted in both cases. The ear was placed in warm water at nearly blood heat, washed and cleaned; then the patient was washed and prepared. The ear was applied and all landmarks noted to make sure of its accurate adaptation. Interrupted horsehair sutures were passed all round, without tying them until the last was passed; by this means the needle was able to be inserted through both edges at corresponding spots. When the sutures were tied taut the ear fell into its exact position. The ear was then covered with gauze and wool and bandaged. A small flannel bag loosely filled with table salt was heated in a saucepan over the fire and renewed when cool. This bag was then laid over the ear outside the dressings and bandage to keep the ear warm and restore the circulation. In both cases the ear became united.—London Lancet.

It is well known that some injuries are especially likely to be followed by shock. In the presence of such injuries, even if the patient shows no shock, take every precaution against a condition which is apt to arise at any moment.—Int. J. Surg.

We are wrong always when we think too much
Of what we think we are; albeit our thoughts
Be verily bitter as self-sacrifice,
We are no less selfish. If we sleep on rocks
Or roses, sleeping past the hour of noon,
We're lazy. —Browning.

Notes of Societies.

Mississippi Valley Medical Association.

The following is the preliminary programme for the meeting of the Mississippi Valley Medical Association at Nashville, October 11-14, 1898:

B. Sherwood-Dunn, Boston, Mass., "Why I Have Abandoned the General Practice of Vaginal Hysterectomy;" J. A. Stucky, Lexington, Ky., "Tonsillitis or Quinsy, Causes and Treatment;" H. W. Whitaker, Columbus, O., "Pichi;" A. Ravogli, Cincinnati, O., "A Few Practical Points in the Treatment of Posterior Urethritis;" Frank Parsons Norbury, Jacksonville, Ill., "The Neuro-Hypothesis of Rheumatoid Arthritis;" A. M. Osness, Dayton, O., "Diphtheria and Its Logical Treatment;" F. E. Kelly, La Moille, Ill., "Varicocele;" F. F. Bryan, Georgetown, Ky., "A Plea for Pelvic Peritonitis and Cellulitis;" John M. Batten, Pittsburg, Pa., "Syphilis;" Geo. W. Johnson, Dunning, Ill., "Gonangiectomy and Orchidectomy for Hypertrophied Prostate in Old Men;" Geo. F. Keiper, Lafayette, Ind., "Wounds of the Lachrymal Apparatus, Report of Operation for Restoration of Canaliculi Obliterated by Traumatism;" Shelby C. Carson, Greensboro, Ala., "A Consideration of the Limit to Operative Gynæcology;" W. H. Humiston, Cleveland, O., "The Relations of the Gynæcologist and the Neurologist;" W. Gaston McFadden, Shelbyville, Ind., "Intermingling and Changing of Type in Diseases;" William F. Barclay, Pittsburg, Pa., "Mercury and Its Action;" J. Rilus Eastman, Indianapolis, Ind., "The Diagnosis of Gonorrhœa in Women;" S. E. Milliken, Dallas, Tex., "Sub-Periosteal Removal of Caries from the Pelvic Basin, with the Report of Cases;" Thos. Chas. Martin, Cleveland, O., "Complete Inspection of the Rectum by Means of Newer Mechanical Appliances;" Geo. D. Kahlo, Indianapolis, Ind., "Hydrotherapy in Stomach Diseases;" Alex. C. Wiener, Chicago, Ill., "Surgical Treatment of Infantile Paralysis;" James M. M. Parrot, Kingston, N. C., "Supra Pubic Cystotomy vs. Perineal Section;" R. C. Pratt, McKenzie, Tenn., "Report of Cases in Obstetrics, with Complications;" John L. Jelks, Memphis, Tenn., "The Relationship Between the Genito-Urinary Tract and Rectum, with Special Reference to the Female;" T. Virgil Hubbard, Atlanta, Ga., "How Should We Treat Typhoid Fever?" W. W. Taylor, Memphis, Tenn., "A Clinical Contribution to Ectopic Gestation;" M. Goltman, Memphis, Tenn., "Interesting Surgical Cases;" I. N. Love, St. Louis, Mo., "The Bicycle From the Medical Standpoint;" Jos. Price, Philadelphia, Pa., "Surgical Treatment of Pus in the Pelvis;" Andrew Timberman, Columbus, O., "Operations on the Mastoid, When and How Performed;" R. A. Bate, Louisville, Ky., "Arthitic Diathesis;" Chas. W. Aitken, Flemmingsburg, Ky., "Diagnostic and Therapeutic Uses of Tuberculin;" G. W. Halley, Kansas City, Mo., "Some Pathological Conditions of the Ovaries and Adnexa Causing Pain."

Iowa State Association of Railway Surgeons.

By order of the Judicial Committee, the date of the annual meeting of the Iowa State Association of Railway Surgeons has been changed from October 6 and 7 to October 13 and 14, at Clinton, Iowa.

A. A. DEERING, Sec'y,
Boone, Ia.

The following named railroads have kindly promised to furnish transportation (provided request is made by general managers) to railway surgeons (not to members of family), who wish to attend the annual meeting of the Iowa State Railway Surgeons' Association, to be held at Clinton, Iowa, October 13 and 14, 1898: Iowa Central Railroad, Illinois Central Railroad, Chicago, Burlington & Quincy Railroad, Chicago, Rock Island & Pacific Railroad, Burlington, Cedar Rapids & Northern Railroad, Minneapolis & St. Louis Railroad, Chicago, Milwaukee & St. Paul Railroad, Chicago, Iowa & Dakota Railroad, Burlington & Northwestern and Burlington & Western railways, Chicago, Great Western Railroad, Keokuk & Western Railroad, Chicago, St. Paul, Minneapolis & Omaha Railroad, Chicago, Ft. Madison & Des Moines Railroad, Chicago & Northwestern Railroad, Sioux City & Pacific Railroad, Des Moines, Northern & Western Railroad. The Wabash railway will furnish transportation to its own surgeons and to salaried surgeons of other roads.

New York State Association of Railway Surgeons.

The eighth annual meeting of the New York State Association of Railway Surgeons will be held at the Academy of Medicine in New York City, November 17, 1898, under the presidency of Dr. C. B. Herrick of Troy.

GEO. CHAFFEE, Sec'y,
Brooklyn, N. Y.

In gangrene of senile people, if it is decided that amputation is not advisable, it is usually best to wash the gangrenous part several times a day with a deodorizing antiseptic, and leave it exposed to the air. It will then become dry, avoiding the stench always present under thick dressings. If pain is prominent give opium, which often seems to arrest the progress of the disease.—Int. J. Surg.

Railway Miscellany.

Obituary.

F. D. Leeds, live stock agent of the Chicago & Alton at Kansas City, Mo., died in that city last week.

Warren N. Draper of Duluth, Minn., attorney for the St. Paul & Duluth Railroad, died at St. Paul, Minn., September 4.

W. V. McCracken, ex-president of the Louisville, St. Louis & Texas, who was recently stricken with paralysis, died August 31.

Albert E. Pancoast, president of the Philadelphia & Reading Coal & Iron Company, died at Elberon, N. J., August 19, at the age of 58 years.

Boaz Rossiter, formerly foreman of the shops of the Detroit, Grand Haven & Milwaukee at Detroit, Mich., died in that city, August 31, at the age of 69 years.

J. B. Haylow, chief train dispatcher of the Birmingham Mineral, a part of the Louisville & Nashville system, died at Birmingham, Ala., August 21, at the age of 27 years.

A. J. Connelly, trainmaster of the Peoria & Eastern division of the Cleveland, Cincinnati, Chicago & St. Louis at Indianapolis, Ind., died in that city last week and was buried at Union City, Ind., August 25.

Ashbel Green, for many years general counsel of the West Shore Railroad and since last July also general counsel of the New York Central & Hudson River, died at his home in Tenafly, N. J., September 5, at the age of 76 years.

John T. Milner, a well-known civil engineer, who was identified with the surveys and construction of many railroads in the South, and who was chief engineer of the South & North Alabama Railroad from 1856 to 1872, died recently at his home in Newcastle, Ala., at the age of 72 years.

H. S. Higgins, cashier in the treasurer's office of the Chicago, Rock Island & Pacific, was fatally burned while taking a vapor bath at his home in Chicago, August 26, and died Sunday, August 28. He was 52 years of age and had been in the employ of the Rock Island road for 18 years.

James Adams, who built the Buffalo Creek Railroad, and was its first president, died at his home in Buffalo, N. Y., August 31, at the age of 75 years. He was also at one time president of the Buffalo, New York & Philadelphia Railroad, now the Western New York & Pennsylvania, and of the Buffalo & Jamestown, now the Jamestown division of the Erie Railroad. He organized and was for several years vice-president of the Brush Electric Light Company. He retired from active business in 1892.

Moody Currier, ex-governor New Hampshire, who died at Manchester, N. H., August 23, was identified with railway interests for many years. He was formerly at different times treasurer of the Concord & Portsmouth, treasurer of the Concord Railroad, and president of the Eastern Railroad, and was up to the time of his death director of several roads.

W. S. Alexander, formerly president and general manager of the Eastern Railway of Minnesota, died at St. Paul, Minn., September 4, at the age of 60 years. Mr. Alexander was born in Burlington, Wis., and entered the railway service 1865, as clerk in the general freight office of the Chicago, Milwaukee & St. Paul at Milwaukee; subsequently he went to the Burlington, Cedar Rapids & Northern, and later became identified with the St. Paul, Minneapolis & Manitoba, of which he was general freight and ticket agent until 1882. In September of that year he was appointed general traffic manager, and was retained in that position when the Manitoba road was leased to the Great Northern. He resigned in July, 1890, and on December 1 of the same year was made president and general manager of the Eastern of Minnesota, which is a part of the Great Northern system. He resigned the general management in November, 1893, and the presidency in August, 1894, and in December, 1895, was appointed assistant to the master in chancery of the Union Pacific.

Railway Accidents in 1897.

From statistics furnished by the Interstate Commission, we learn that the total number of casualties to persons on account of railway accidents in the United States, for the year ending June 30, 1897, was 43,168. Of these casualties, 6,437 resulted in death, and 36,731 in injuries of varying character. Of railway employes, 1,693 were killed and 27,667 were injured during the year. According to the three general classes, these casualties were divided as follows: Trainmen, 976 killed, 13,795 injured; switchmen, flagmen and watchmen, 201 killed, 2,423 injured; other employes, 516 killed, 11,449 injured. The casualties to employes resulting from coupling and uncoupling cars were: killed, 214; injured 6,283. The corresponding figures for the year ending June 30, 1896, were 229 killed and 8,457 injured. The casualties from coupling and uncoupling cars were assigned as follows: Trainmen, killed 147; injured, 4,698; switchmen, flagmen and watchmen, killed, 58, injured, 1,325; other employes, killed 9; injured, 260. The casualties resulting from falling from trains and en-

gines were as follows: Trainmen, killed, 325; injured, 2,726; switchmen, flagmen and watchmen, killed, 32; injured, 357; other employes, killed, 51; injured 544.

The casualties to the three general classes of employes mentioned caused by collisions and derailments were as follows: Trainmen, killed, 250; injured, 1,327; switchmen, flagmen and watchmen, killed, 11; injured, 74; other employes, killed, 42; injured, 251. The total number of passengers killed during the year under review was 222, injured, 2,795. Ninety-three passengers were killed and and 1,011 injured in consequence of collisions and derailments. Other than employes and passengers the total number of passengers killed was 4,522; injured, 6,269. Included in these figures are casualties to persons classed as trespassers, of whom 3,919 were killed and 4,732 were injured. From summaries showing the ration of casualties, it appears that one out of every 486 employes was killed and one out of every 30 employes was injured during the year. With respect to trainmen, including enginemen, firemen, conductors and other trainmen, it appears that one was killed for every 165 employed, and one injured for every 12 employed. One passenger was killed for every 2,204,708 carried, and one injured for every 175,115 carried. Basing ratios upon the number of miles traveled, it appears that 55,211,440 passenger-miles were accomplished for each passenger killed, and 4,385,309 passenger-miles for each passenger injured.

Fall of the New York & Ottawa Bridge.

Two spans of the large bridge being erected over the St. Lawrence river at Cornwall, Ont., by the New York & Ottawa railroad collapsed on September 6, and were completely wrecked, the stone pier which supported them giving away, owing, it is thought, to the action of the water on concrete foundations. At least fourteen men at work upon the structure were killed and seventeen others were seriously injured. There were over 80 men at work on the bridge, and as many of them are unaccounted for, it is feared that they were crushed to death under the wrecked structure. The bridge was being built by the Phœnix Bridge company, and the piers had been put in by Sooysmith & Co. of New York. A press dispatch gives the following particulars:

"The bridge consisted of three spans, each 37 feet, and 37 feet above the waters of the St. Lawrence, which at this spot is extremely rapid. The three spans are supported on stone piers, one on the American mainland, two in the river, and one on Cornwall island. The two spans closest to Cornwall island were finished and the whole force of the Phœnix Bridge company, which has the contract for the steel work on the bridge, was employed on the span next to the mainland, removing the traveler, the span having been completed Saturday afternoon. At noon pier No. 2, counting from the American shore, suddenly crumbled and fell away into the swirling current, and it was followed with a mighty crash by the center span and the span next to the American shore, with the traveler and the men on it. The center span dropped straight into the river and then fell over toward the east and now lies on the bottom of the river, visible to anyone in a boat above it. But two men were working on it, and they were fortunate enough to escape with a few bruises. On the other span the men were working on the flooring of the bridge, and it was among these workmen that the greatest loss of life occurred. They were crushed beneath the heavy ironwork of the bridge and the traveler."

Said of Our Railroads.

Li Hung Chang, the great viceroy of China, said: "Nowhere else in the world are there such fast and luxurious trains" as in America.

Marquis Yamagata, field marshal of the Japanese empire, said: "The speed, the comfort, the luxury of your railroads is a marvel to me."

Prince Hilkoff, imperial minister of railroads of Russia, said: "There is nothing in Europe to compare with your railroads."

Sir Henry Truman Wood, special representative of the British government to the World's Fair in 1893, said that "nowhere in Europe could there be found such luxury in travel and such excellent service as are given on the railways of the United States."

Paul Leroy Beaulieu, one of the greatest economists of Europe, writes: "The continent of Europe, by the bonds in which it has always held private enterprise, has been able to follow only with a tardy step the example of the United States, which nation has realized in its railroad system three ideal conditions—rapidity, efficiency and a good market—while Europe, enveloped in administrative formalism, was destined to attain neither of these conditions."

An official of the Chicago Great Western is quoted as follows: "The plan of selling stock to employes is working fairly well, office employes taking most advantage of it, though many engineers and conductors have come in. The company buys for them preferred A and debenture stock at the market price and they pay for it at the rate of $10 per month."

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CONSERVATISM.*

BY W. H. COFFEY, M. D., OF PARKSVILLE, MO.

The manner in which I propose to discuss this subject is not so much as to the benefit derived by the fortunate or unfortunate individual who may undergo a surgical operation, but rather the effects of conservatism upon the surgeon and the profession in general That the interest of the patient is paramount to all others cannot be gainsaid, but yet the interest of the operating surgeon in a great many instances is so closely allied with that of the injured that it is hard to tell which is the greater. Anything that adds or detracts from a surgeon's reputation widens or narrows his usefulness to those he hopes to serve in the future.

We often hear it stated that the surgeon's duties are threefold: First, to the injured; second, to the public; third, to the railway which he serves. It was a surgeon who stated that list of duties, and, being a surgeon, he was, of course, too modest to mention the duty he owes himself. I do not know why the members of this association should be so modest and exclusive on that point, for I thought all those modest and exclusive gentlemen left us at our Galveston meeting.

It may be a violation of the code of ethics for us to have any other duties but those we owe to others; on that point I am ignorant, for which I am thankful to-day, for I wish to add one more duty to that list and place it with the first, the position it should occupy, inasmuch as the duty the surgeon owes himself is so inseparable from that he owes the patient that he cannot neglect the one without affecting the other. May we never become so scientific as to forget this fact. "Thou shalt love thy neighbor as thy self," does not mean that you should love your neighbor better than yourself, but to the contrary, it implies that he who wishes to succeed in making himself useful to his fellow men must have the requisite self-esteem. That the strong are regarded and the weak disregarded is a fact; therefore, I say, the time has arrived when we should begin to discuss more especially the duty we owe our profession and ourselves as bread winners for our families, as well as the duty we owe to our fellow men.

Conservatism in surgery perhaps more than anything else, I was about to say more than a perfect knowledge of surgery, is commendable, but conservatism on the part of the surgeon in giving his advice as to surgical interference prior to the operation is worth a thousand times more to him, his profession, and the people at large whom he serves than conservatism during the operation. I speak to-day from a country doctor's standpoint, whose experience has been gained during a number of years of active general practice in an extensive rural district adjacent to one of our large cities, where I have been in close touch with the country doctor and the city surgeon, and I tell you now that it is the observation of my co-practitioners and my own—with all honor to the city surgeon—that the tide of surgery swelled by the advent of anæsthetics and antiseptics has come very near the danger mark, and if the surgeon does not at an early date see his danger and of his own free will become more conservative, the laity will force him to become so. A few years ago the laity were astonished by the surgeon's knife and it did seem as if very nearly all the people viewed it as a panacea for their every ailment. Someone has said, and said truly, that science moves slowly, very slowly; we are coming to know this better year by year; there was a time when the flashlights thrown out from our scientific centers made us dizzy, so quickly they came and so quickly they went,

*Read at the eleventh annual meeting I. A. R. S., Toronto, 1898.

leaving us in the darkness, darker still for their coming, yet while so many of those flash-lights have been sent out, as it were, for the mere purpose of dazzling us, and while they have lost their disturbing power, they have had the effect of broadening our minds, making us more thoughtful and conservative in our advice and actions.

What we country doctors want are truths in all their simplicity, we have neither time nor opportunity for experimenting, we have no well-equipped hospitals, no confidential assistants, nor valiant nurses at our command. Our patient is in his country home, it may be a miserable one-room shack, kitchen, dining room, sitting room, and parlor, all in one, which so often serves as home for a family of eight or ten persons; or it may be a respectable farm house; but in either case the unfortunate individual is surrounded by his family and kinsmen, and old lady Sucker and sister Sue are there, to tell the folks what they would do if they were you; we don't need to trouble ourselves about sending for a consultant, they are always there ahead of us.

If you will consider the fact that it is impossible for a country surgeon to see his patient oftener than once in twenty-four or forty-eight hours, and with the knowledge that during the hours between his visits the patient will be in the hands of incompetent nurses, I say, when you consider these facts, you can readily see what a great temptation for a country surgeon to do for a crushed foot or hand—an immediate amputation. There was a time when we could do that with impunity thereby satisfying ourselves, patient and friends; but that day is past. Owing to our increased numbers so great has become the competition that the laity are not as loyal to the doctor as they were in former years, for the practice of surgery and medicine is departing from the time honored custom and is becoming more and more a business controlled by the law of supply and demand, and he who is so scientific as to fail to conduct his practice in a business way is not mindful of his duty, and he will sooner or later have doctor's office fixtures for sale and his days of usefulness in his chosen profession will be over. I appreciate the fact that my remarks are not in the strictest sense surgery, but I hope they are common sense; for if there is a vocation followed by man on earth to-day where it is essential to use common horse sense, that vocation is surgery.

I maintain, and I hope you will not consider me egotistical, that we country doctors, owing to our close relation, have been better able to keep our fingers on the pulse of the laity than you gentlemen who have risen to that high and responsible position of consulting surgeon. 'Tis true we look to you as our special friend, and it is in your behalf that I desire to speak of a few things which I consider to your interest. I feel to-day like saying to you, as Festus said to Paul, "Much learning doth make thee mad." No, it is not madness, but it is knowledge breeding discontent; there is a burning desire in the heart of every surgeon to do something original, to perform the greatest number of operations and do them in such a manner that they may be known as theirs, carrying their name on and on to the end of time. That is ambition against which I have naught to say, if it is done in an honest and intelligent way, but many of our men are only able to see the mechanical part of surgery—and ambition misdirected in our profession leads to butchery. It is not the number of operations a man may perform that gives him reputation to-day. Competition in our profession has educated the people to some extent in a surgical way, therefore they are considering your number of mortality cases; and it is time that he who is doing the indiscriminate cutting should stop and take his bearings and aid in stemming this tide of popularism in surgery. If he does not, mark my words he will have fewer opportunities for cutting in the future. Many a good and useful man's name has been brought in disrepute owing to his lack of conservatism. About the first question our country patients ask us when we speak of sending for a consulting surgeon is, "Doctor, is he a conservative man? Is he considerate?" and if the patient has perchance heard much of the surgeon's propensity for cutting, no amount of persuasion will induce them to send for him.

It is not necessary for me to mention (for you would not have the patience to listen) to the number of cases of slight lacerations of the os, endometritis, pelvic cellulitis and appendicitis which have occurred in my own practice where the consulting surgeon has advised surgical interference—the patient refused and

then proceeded to get well. How many cases of this kind can every country practitioner count in his own immediate neighborhood as living testimonials against the judgment of the consulting surgeon; too many of our surgeons, where there is a doubt, will advise surgical interference and call that giving the patient another chance for his life.

I hope you do not think me so egotistical as to presume for an instant that country doctors are wiser than the city surgeons, for my experience has taught me that all men are fallible, but I believe the consulting surgeon to be as little so as most men are, for we must remember that he is at a great disadvantage, he sees the case for the first time, and he must depend on the attending physician for the history, which is often incorrect; the attending physician feeling relieved from further responsibility, he throws the whole matter on the shoulders of the consulting surgeon. If I were a consulting surgeon called for the first time to see a patient, and if it were not a case for immediate action, I would delay the operation, keeping the patient under observation until a time when I was satisfied that nothing else would do. Any person about to undergo a surgical operation appreciates this—he wants to know that the surgeon is a conservative man, that he has his best interest at heart, and above all things, that he has avoided the use of the knife as long as possible. This is a duty the surgeon owes himself, as well as his patient. A short time ago I had occasion to send a patient of mine to see a surgeon, whose friendship I greatly esteem, and in whose ability I have as much confidence as I have in any man. I had treated the patient for some six or eight weeks for remittent fever, complicated with hypertrophied liver, with a history of chronic malarial cachexia. He was convalescing, but continued to have a little fever. My reason for sending the patient to the doctor was that I suspected an abcess of the liver. He examined the case and diagnosed gall stones; he gave the patient an open letter to me, advising an immediate surgical interference. The patient refused, but continued to take phosphate of soda and a tonic of iron, quinine and strychnine, and in ten days I took him to see the surgeon again; when he saw my patient was so greatly improved he said that he would not then advise an operation. Here were two opinions given by a man of wide reputation within ten days. It is not hard to guess what that patient thought of the consulting surgeon. Gall stones and a surgical operation meant a great deal to him, and when he found out that he did not have to submit to it he felt greatly relieved, and he did not give the consulting surgeon any credit for it. I might mention a number of such cases which have occurred in my own practice, but it is not necessary; I only wish to emphasize the fact that the time is here when the surgeon, for his own reputation and reputation of the profession at

large, must be more conservative in giving his opinion as to the necessity of surgical interference.

Regarding conservatism as it effects the injured, I have but little to say, inasmuch as it has been discussed on the rostrum and in our society halls until it has become, no doubt, to most of you, a very trite one; therefore, with your indulgence a little further, reporting of one case of traumatic surgery will suffice.

A boy in perfect health, fifteen years old, was thrown under a moving train, the car wheel passing directly across the foot, skinning the dorsal surface from the tarsal bones down to the phalanges, bursting the plantar surface from the head to the base of the metatarsal bones to such an extent that a probe was readily passed through the foot anywhere between the first and second metatarsal bones. After cleaning the parts as thoroughly as possible with a 2 per cent solution of carbolic acid and ethereal soap, I proceeded to clip away all the ragged tissue, which in my judgment was left with insufficient circulation—bringing the parts in apposition as best I could with catgut sutures and then dusting with campho-phenique powder—not having the campho-phenique gauze, I used iodoform gauze—placing the foot a little above the level of the body, covering it with warm cloths, wrung out of 2 per cent carbolic solution, and instructed the attendant to change it as often as necessary to keep it blood warm. We continued those warm applications for about forty-eight hours, when, without disturbing the original gauze, the foot was dried and a dry roller bandage placed on. The boy continued to rest nicely, his temperature never going over 101. We kept his bowels open and it being in a malarial district, gave him tonic doses of quinine three times a day for several days. On the eighth day the dressing was taken off for the first time, when I found that the great and second toes and the head of the first metatarsal bone were dead. Pulling away the dead toes, and cutting back on the inner surface of the first metatarsal bone, I amputated it about the center of the middle third. Pulling the third toe over and suturing it, as you may see in this picture, so that it might take the place of the first and second toe as much as possible, thereby giving a greater base for the toes—and it has indeed served the boy so nicely that you could not tell by his gait that he had ever lost any part of his foot—however, I had considerable trouble with the dorsum of the foot, where a surface as large as a dollar was left without integument. I continued to dress it every day or two with campho-phenique powder, and it was some two months before the skin covered the part, leaving—as you see in the picture—not a perfect foot, but a very useful one to the boy.

Under the light of antiseptic surgery there is no excuse for doing an amputation when it it not clearly necessary. If there is any doubt, the patient is entitled to it. Our duty to our patient is to save every article of a foot or hand in the best shape possible. Crooked toes and fingers do not look well, but if they have strength in them, they will certainly be of service to the patient—if they are of no use, our conscience is easy, inasmuch as we have done our duty. If a patient so desires, he can have an operation done for utility and cosmetic effect, under more favorable circumstances, when the surgeon can tell for a certainty how much to cut away; it is a very easy matter to amputate a foot or hand, but we must remember they will never grow again.

A good rule for a surgeon to follow is, "Do unto others as you would have them do unto you."

DISCUSSION.

Dr. William S. Hoy of Wellston, Ohio: I only heard two-thirds of the gentleman's paper, but it seems to me with reference to conservatism in surgery, that the cross-roads surgeon, as we see him, has as good a brain, and just as ample resources for research as the man in the best equipped hospital in the country. He can keep his hands just as clean; he can practice asepsis, and when he does that he has undoubtedly antisepsis. Let this association bear in mind one question regarding the science of surgery; let us go back to the Egyptian and other ancient arts, and from that time to the present we find that knowledge has been handed down to us generation after generation, consequently the science of surgery is not the product of a single country, or man, but it is the accumulated product of all ages, and surgery to-day stands on an eminence of which we may feel proud. The country doctor has his hours of consultation; he has his hours for thought and study, but unfortunately

he has not, in many instances, the great hospital facilities which some of our city physicians have. The city surgeon does everything to meet the emergencies and exigencies of the cases as they arise. He has everything at his hands, so to speak; whereas the cross-roads doctor in his conservatism, under force of circumstances, is compelled to meet certain exigencies as they arise, and has to be prepared to battle with the case in hand. I have profound respect and the highest admiration for what a great many people choose to term the country cross-roads doctor, because I tell you the brains, the intellect of this country, the best men we have in our profession to-day, the men who have step by step ascended the ladder of fame have come from the cross roads. (Applause.) There cannot be too much respect shown to a man who is placed in a position sometimes like the doctor in the country.

I believe there is a gentleman here to-day from the state of West Virginia, who sent a case some time ago to a hospital with fracture of the spine, and a compound comminuted fracture of the left leg. The man was brought to the hospital at midnight; I saw him, and concluded that it was wise to defer operative interference until the morning. In the morning we found that gangrene had attacked the left leg, and had progressed almost to the knee. The man was completely paralyzed from the hips down. He had been transported two hundred and fifty miles to this hospital, and when he was brought in I did not know what to do. In dealing with such cases the matter of conservatism is bound to confront us, no matter how well or how poorly we are fixed. There is not a conscientious surgeon here who will not try to save a limb if he can possibly do so, but if he has to take it off, he will do so afterwards. Here comes in the question of immediate operation. Professor Gross in his former days said that if a man, anxious to operate, instead of using conservatism, would only use an ample sufficiency of sterilized hot water, he would at least cool off his operative desire and give the patient a better chance for recovery.

I want to say that this man was brought into the hospital for the purpose of having laminectomy performed, but he was in no condition for such an operation, because, as I have previously remarked, gangrene had set in in his leg; the leg sloughed; a line of demarcation formed; I ligated the femoral artery, and amputated the leg. Laminectomy was not resorted to.

REPORT OF A CASE OF LIGHTNING STROKE WITH ACCOMPANYING FRACTURE OF BASE OF SKULL.*

By Dr. C. F. Leslie of Clyde, Kan.

There are a great many forms and varieties of injuries, as well as different causes of injuries, nearly all of which can be collected in distinct groups, as occurring with more or less frequency.

Occasionally we meet an accident which is very rare, but it is exceedingly difficult to find one where there has never been one like it. Yet so far as I have been able to ascertain, it remains for the subject of this report to be the first man to receive an injury by being knocked from the top of a freight car by lightning while the train was in motion.

George Stine, a brakeman on the Missouri Pacific, was struck by lightning near Clyde, Kan., on August 2, 1897, and knocked from the brake on the top of a freight car, where he was sitting at the time, while the train was running at full speed.

He was severely burned by lightning on the right side of his chest, on the right hip and buttock, and in the right groin.

A handkerchief which he wore about his neck was cut squarely in two, and a portion of his watch and chain was melted by the lightning. He fell head foremost from the top of the brake, striking the ground on the side of an embankment, where the roadbed had been raised several feet, making his fall about fourteen feet, with the momentum of the train added to the fall.

When taken up he was insensible, and had two scalp wounds, one about one inch long over frontal bone on right, and one four inches long over left parietal bone. He also sustained, as the symptoms afterward showed, two distinct fractures of the base of the skull.

At the time I saw him, about one-half hour after the accident, he was entirely unconscious, either from the effect of the lightning or from concussion, or probably both.

*Read at the eleventh annual meeting, I. A. R. S., Toronto, July, 1898.

His breathing was stertorous, pupils dilated, temperature 97, pulse 48, irregular and feeble. Blood was running from nose, mouth and ears. He also vomited blood more or less for thirty hours. Would not have been surprised at his death at any moment while we were moving him from the train to the hotel, or while his wounds were being dressed the first time.

The scrotum was nearly torn off, and there was a deep laceration five inches long in the right groin. The tissues here were burned black, would not hold stitches, sloughed in a short time and subsequently healed by granulation. The scalp wounds and the burns on the body healed in a reasonable time.

On the third day the symptoms of concussion had nearly subsided. He then began to take nourishment and recognize friends, but he was entirely deaf. On the second day clots of blood began to form behind both eyeballs, causing them to bulge forward. The blood also infiltrated the tissues beneath the conjunctiva, covering more than half the eyes with dense clots of blood. There was marked ecchymosis about the lids and orbits, and beneath skin in left mastoid region. These clots and ecchymoses began to be absorbed on the eighth day.

The hæmorrhage and serous discharge from the ears, which had been quite profuse all the time, ceased on the tenth day, and on this day we took him to the hospital at Kansas City. He stood the journey well and made a good recovery, going back to work January 1.

My diagnosis was that, in addition to his external injuries, the effects of lightning and concussion of the brain, he had sustained two indirect fractures of the base of the skull, caused by the head striking the ground. Dr. Armstrong of Greenleaf, Kansas, and Dr. Priest of Concordia, Kansas, saw the case with me and agreed with this diagnosis, which was also confirmed by Drs. King and Hamiel of the Missouri Pacific Hospital of Kansas City, Mo., and Drs. Thompson and Punton of Kansas City.

The treatment consisted at first, after his wounds were dressed, of ice-cold applications to the head and dry heat to the body and extremities. As soon as the patient could swallow, five grains of calomel were given and the dose repeated in four hours.

Morphia ¼ gr., atropia 1-150, strychnia 1-60 and ergotine 1-10 were given by hypodermic injection about every six hours for ten days.

The bowels were kept open and cold applications were continued to the head. The ears were frequently cleansed and plugged with absorbent cotton. The bromides were given in moderate doses by mouth after patient was able to swallow.

There was also quite a free hæmorrhage from the wound in groin which might have had some influence in relieving brain symptoms.

The two important features in this case are the lightning stroke and the fractures of the base.

Packard, in the American edition of Holmes' "System of Surgery," says:

"Accidents from lightning in this country are very rare," and says further: "It has never fallen to my lot to witness immediately on their occurrence any which called for serious surgical treatment." A person struck by lightning, and not killed outright, is more or less completely deprived of consciousness. This is in consequence of the shock to the brain and is accompanied by more or less paralysis of motion and sensation. The insensibility sometimes lasts for a considerable length of time; as in a case recorded by M. Boudin, in which a gentleman having been struck by lightning remained for an hour and a quarter without (as the bystanders affirmed) any signs of life, and then, after being exposed to a pelting shower of hail, recovered.

Other affections caused by lightning are burns, eruptions, loss of hair over part or whole of the body, wounds, hæmorrhages from the mouth, nose and ears; loss of sight, hearing, speech, smell and taste, or in rare cases exaltation of these special senses; cataract, imbecility and abortion. Mutilations or lacerations of the body are very rarely met with. Out of a large number of fatal cases, M. Boudin found only six where mutilation occurred, yet it will be noticed that this case can be classed as one of the mutilated cases from lightning. In cases not immediately fatal, the prognosis is usually favorable, where no other injuries exist except from lightning; and even where some of the special senses are abolished, their restoration is not hopeless.

There are two principal causes of fracture of the base of the skull: One, such as gunshot wounds, bayonet or sword thrusts, or punctures from any sharp or pointed instrument, causing direct fractures. The other, fractures caused by blows or falls striking against the opposite side of the skull. These are classed as indirect fractures of the base. There are other ways in which a fracture at the base may occur, such as an upward thrust of the spinal column against the condyles of the occipital bone, or by lightning; the lower jaw has also been driven with such force against the base of the skull as to fracture it.

The fractures in this case were evidently caused by the fall, striking the frontal and

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parietal bones against some hard substance, causing two indirect fractures, one in the anterior fossa, involving the orbital plates of the frontal bone, the other in the middle fossa, involving the petrous portion of temporal bone. In no other way can I account for the blood clots in the orbits and under the conjunctivæ, the ecchymoses about the lids and orbits, and in the mastoid region, and the profuse flow of blood and serum from the ears.

Direct fractures of the base of the skull are very rare in civil practice, a very large majority of such cases being confined to army practice, and a very frequent cause of these fractures is the impact from projectiles.

The surgical history of the War of the Rebellion contains a great many cases of this kind, and, strange to say, there were many recoveries. Packard collected from this history one hundred and thirty-five cases where recovery was more or less complete.

Indirect fractures of the base are by far more frequent than direct, so much more, indeed, that it is claimed by good authorities that they form the greater part of the head fatal injuries in civil practice. The location of indirect fractures of the base of the skull are divided as to frequency in the proportion of about one-fifth each to the anterior and posterior fossæ and three-fifths to the middle fossa, though in severe cases the fracture may involve two or even all three of the fossæ at the same time.

SYMPTOMS.

The only symptoms that can be depended

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upon as indicative of fracture of the base are either the escape of some of the cranial contents, or an injury done to the nerves as they emerge from the skull. The contents which may escape are blood, serum or brain substance, blood being the most common.

In order that the escape of blood may take place, the line of fracture must involve some of the large vascular channels lying at the base, and must open a road through which the blood may get out of the skull, where it may become visible. A fracture of the base may manifest itself by an escape of blood in the cellular tissues of the orbit and eyelids; by bleeding at the nose, or subsequent vomiting of blood; by bleeding from the ears; by an escape of blood into the mastoid region, or into the tissues at the back of the head. The blood, that reaches the back of the orbit, soon

makes its way forward, readily infiltrates the loose cellular tissue of this region, shows itself under the ocular conjunctiva, and subsequently spreads into the eyelids. Effusion of blood under the ocular conjunctiva is, then, a sign by which a fracture of the base may be recognized, yet a fracture of the base may exist without an effusion. Bleeding from the nose or mouth or vomiting blood occurs not infrequently after head injuries, but the great vascularity of these parts renders this bleeding of much less value as a diagnostic sign than bleeding from the ear. Bleeding from the ears, after severe injuries of the head, has for many years been held as one of the most valuable diagnostic signs of fractured base, but to be of any value it must be of considerable quantity, and must continue for some time. Holmes says that with such a bleeding we may safely diagnose fractured base, running through the petrous portion, and opening up a communication between the cavity of the tympanum and some of the numerous channels which surround this bone. Packard says, "Out of thirty-two carefully dissected cases of fracture of the middle fossa, involving the petrous bone, in fifteen cases the flow of blood was profuse and continuous." Park says that "exophthalmus" such as occurred in this case by blood accumulating within the orbit, "is most significant but not common."

In these cases where the fracture of the petrous portion communicates with the venous sinuses on the inside of the skull, and in which there is no rupture of the membrana tympani, there can be no bleeding from the ear, but in such cases the blood finds its way through the Eustachian tube, so there may be bleeding from the nose or mouth, or subsequent vomiting of blood. When the hæmorrhage is profuse, even if the tympanum be ruptured, the blood may pass through the Eustachian tube, so that there may be bleeding from the nose, mouth and ears at the same time, as was the case with Mr. Stine.

PROGNOSIS.

It used to be considered that if the patient died in such a case as we have been describing, that probably he had sustained a fracture of the base of the skull, but if he lived the fracture did not exist. Gross says, "Fracture of the base of the skull is one of the most serious of accidents; if it do not always terminate fatally, the number of recoveries are so few as to form merely an exception to the law, which is by many regarded—and very justly so—as general."

Park says, "The majority of basal fractures are fatal," and Nancrede says, "Death is the usual result of these fractures."

SUMMARY.

Three important facts appear in this case:

First. He was struck by lightning while on the top of a moving train, was not killed, but parts of the body were severely mutilated.

Second. Fracture of the base of the skull occurred through both anterior and middle fossæ.

Third. Recovery ensued where death seemed inevitable and patient has since returned to his place on the road.

The lesson learned from this case is, while not claiming recovery as the result of treatment, that surgical interference is not always necessary in severe injuries to the head.

DISCUSSION.

Dr. Milton Jay of Chicago: Fractures at the base of the skull, occurring from any cause, are generally fatal, as every surgeon knows, but they are not always so. It seems to me the doctor in his paper gave us unmistakable evidence that the base of the skull was fractured, in that there was hæmorrhage from the ear and nose, and the hæmorrhage which causes protrusion of the eyeball and the conjunctiva is of a serious character. Of course, the peculiarity in this case was that the man in the first place was injured by a stroke of lightning, but that does not always kill, although it may produce severe injury. The discharge of cerebro-spinal fluid is usually unmistakable evidence of fracture at the base of the skull, and you can readily dètermine whether it is cerebro-spinal fluid or not by chemical tests. The discharge indicates rupture of the meninges, and in three cases I have known of recovery taking place after such a rupture had occurred. The cases in which rupture extends to the meninges, the spinal cord, the base of the brain, or where the petrous portion of the temporal bone presses upon the meninges, are serious.

The doctor's treatment is admirable. Rest is the main thing, and instead of allowing such a patient to become active he should be kept under as good control as possible. A good

deal may be learned from a paper describing such an injury, in which there are unmistakable evidences of fracture of the base of the skull followed by recovery.

Dr. L. Worsham of Evansville, Ind.: This is indeed a very interesting and instructive case; in fact, all of these cases where we are certain we have a fracture at the base of the skull, and can report recoveries, are interesting. It makes little difference to us whether it is a stroke of lightning, a bicycle or a runaway horse that strikes a man, so long as it produces a fracture at the base of the skull. Not long since there came under my observation a lady who was struck by a bicycle, following which she had profuse hæmorrhage from the ear, bleeding from the nose, and also ecchymoses of the eyelids and underneath her eyes. There was, however, no general paralysis or any indication that there was any special motor disturbance about either the leg or the hand. We kept the ear in an aseptic condition by using injections of antiseptics, keeping the ear stopped with sterilized cotton, and she made a very nice recovery, although there is now an obfuscation of her mental faculties; she walks, talks and performs the ordinary duties of her household.

I saw another case of fracture previous to this one which manifested all of the symptoms we have enumerated. In addition there was depression of the occipital bone, this depression being relieved by an operation. The patient, however, died. As we had operated on this case they would not allow us to make a post-mortem examination, but I have no doubt there was a fracture at the base of the skull.

Dr. A. L. Fulton of Kansas City, Mo.: I would like to say a word or two in reference to some points in the doctor's paper. One of the speakers promptly detected that one of the most prominent symptoms had not been mentioned in the paper, namely, the escape of cerebro-spinal fluid. The escape of fluid from the ear is not a positive sign or symptom that we have fracture at the base of the skull; but when we have a profuse and long-continued escape of serum, then we know we have a fracture at the base of the skull. But a very important fact has not been brought out, and it should be considered with this case of fracture and with the escape of cerebro-spinal fluid, and that is the treatment. It is generally supposed that we can do very little for a case of fracture at the base of the skull except to keep the patient quiet. We forget, possibly, that we have here a compound fracture. Now, you would not presume to treat a compound fracture of the extremity by keeping the patient quiet. You would first put on a retaining apparatus and you would apply aseptic dressings.

What must you do in a fracture at the base of the skull? Let the patient alone with escape of cerebro-spinal fluid and keep him quiet. You have a compound fracture; you have bleeding from the nose and ears, followed by the escape of cerebro-spinal fluid. You must wash out the ears, dress them antiseptically, or apply aseptic dressings to the ears. You must also, to do your duty, clear out the nasal fossæ and dress them antiseptically to prevent infection. If the patient survives the first effects of the injury, he may not the second, by reason of your carelessness in allowing septic organisms to enter the cavity of the brain through this compound fracture. That is a point which should never be forgotten.

Dr. W. R. Hamilton of Pittsburg, Pa.: I have had some experience with cases of fracture at the base of the skull and the escape of cerebro-spinal fluid is sometimes very extensive. I recall one case in which more than one quart of cerebro-spinal fluid was discharged from the ear and yet the patient recovered. I saw another case, in which I do not know the exact amount of fluid that escaped, but he recovered also. I have made several post-mortem examinations on patients who have died from fractures at the base of the skull in which there was no hæmorrhage from the nose or ear, or any other point, but the fissure started near the top of the skull, extended through to the base without producing any ecchymosis or any bleeding from the nose. The amount of cerebro-spinal fluid that is discharged sometimes in cases of fracture at the base of the skull is surprisingly great.

Infection in deep tissues often gives rise to no other symptom than deep pain, and sometimes inability to move the part. Wherever there is deep pain with rise of temperature inspect the nearest lymphatic glands.—Int. J. Surg.

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MODERN GUNSHOT WOUNDS.

The details of the bullet wounds treated during the late war will prove very interesting reading when they are published, for, save a few frontier skirmishes in India and the Abyssinian war, it has been about the only test to which to subject modern small-caliber weapons. As a matter of fact, the details to be had show that, as in other campaigns, probably the majority of deaths are due to disease, yet poetic justice requires that a soldier die either on the field of battle or from injuries received there.

While the trend of ingenuity has been to render modern bullets more deadly, on the other hand the progress of medical science has made the resulting wounds less deadly. Of course this is due to the antiseptic method and is emphasized by the dictum of the late Prof. Nussbaum that "the fate of the wounded man rests in the hands of the one who applies the first dressing." Again, the discovery of the X-ray has been of inestimable value by doing away with the necessity for probing the wounds, either with an instrument or the finger. Moreover, the small-caliber bullet has less chance of carrying infective clothing before it.

As regards calibers, the Krag-Jorgensen used by the regulars has a caliber of 30-inch; the Spanish troops use Mauser rifles, the improved ones of .27 caliber, the old variety .43, and the volunteers mostly Springfields, with a caliber of .45. Owing to this reduction in the caliber, both the velocity and rapidity of rotation are markedly increased in the new projectiles as compared with the old style.

As the velocity is so much greater the modern bullet, notwithstanding its smaller size, is capable of doing a great deal of damage. For the first two hundred yards the course is somewhat unsteady, then for eight to ten hundred yards it is more so, and then begins to be unsteady again. The large, ragged wounds like those caused by an explosive bullet seem to be inflicted while the bullet is in its unsteady flight. The disastrous effects on the hollow viscera and the brain, where the brain may be completely disorganized or the viscera pulpified, is due to the law of physics that fluids cannot be compressed. This is proven by Woodhull's experiments on tin cans, both empty and filled with fluid. In the empty cans the missile passed through, making clean-cut holes; in the cans filled with liquid various explosive effects were found, according to the amount of the liquid and its density, up to annihilation of the can.

It was supposed formerly that the heat generated by the discharge of the bullet was enough to sterilize it before it left the weapon. This supposition is disproved by the experiments of Dr. Le Garde, a surgeon in the U. S. army. This experimenter inoculated cartridges with various bacteria, mostly anthrax, they were then fired into various substances and cultures they made from these materials. His experiments show that while anthrax bacilli were not affected by the heat, weaker microbes might be killed, so it is not likely that bullêts are rendered sterile by the heat in discharging them.

In short, as Prof. Senn puts it: "In theory and practice military surgery is equivalent in every respect to emergency practice in civil life."

Translations.

OPERATIONS ON THE LYMPH GLANDS.

By Dr. Q. Vanderlinden, Ghent, Belgium.

(Translated for The Railway Surgeon.)

Before discharging into the blood current the lymph has to traverse a greater or less number of special organs, ranged along the vessels which by their structure and situation may be considered as stations for filtering the lymphatic fluid. But the role of the glands is not limited to this mechanical action alone; they not only arrest substances brought to them, but they modify them. These modifications, whose final result always is the attenuation or annihilation of the injurious effects of a foreign body—operate under the influence of the phagocytic or chemical action of the white corpuscules, for which the glands are the principal centers of formation.

This protective role certainly exists in the same degree in the primary and secondary affections of the gland. We shall occupy ourselves only with the latter, and especially those of a toxic or infectious nature. The lymph glands, thanks to their normal function, are all particularly fitted to support the attacks of noxious matters absorbed into the lymphatic circulation.

Let us suppose that a staphylococcic, streptococcic or tuberculous infection of the subcutaneous connective tissue reaches the neighboring glands. What will happen? Very frequently the resulting inflammation is but transient, and the organism gaining the ascendant recovers its normal state without the morbid principle passing the glandular barrier. In other words, the noxious principle has been destroyed by the reaction of the glands.

Under other circumstances this action of the gland results in serious alterations for itself. If the carriage of the virus from the primary focus continues, if the bacteria are very virulent, and if the organism is less resisting, the gland saves the latter only at the price of its own integrity.

When the gland is thus destroyed in great part and has lost its resistance, so to speak, bacteria may develop in it. Under these conditions the defense of the organism is not yet compromised, and general infection is not inevitable, for the barriers which a microbe must pass before reaching the blood current are very numerous. It is none the less true that this invasion of the gland constitutes a danger to the economy, for, by being repeated from stage to stage, general infection of the organism may ensue. In exceptionally grave cases the microbe may overleap the glands without irritating them very much, and produce a general infection of the individual from the beginning.

What course should we pursue when confronted with an infected, swollen, painful gland? As we know that the organism can often conquer the disease on account of the resisting power of the lymph vessels and glands, the rule should be to respect this defense of the individual and to aid it by preventing further access of noxious materials from the initial focus by the use of appropriate local measures. If this primary infection has proceeded to destruction of the gland, then the enemy should be dislodged by incision, scraping out or extirpation of the gland.

As regards treatment of specific inflammations, and especially tuberculous adenitis, surgeons differ widely in their views. For instance, some extol abstention and content themselves with the general treatment of the patient; others advise early extirpation of the glands. Both these modes of treatment have their defenders. In our opinion, both these methods are open to very serious objections. Neither of them meets all indications, and it is in practical medicine especially that we must recognize special circumstances presenting themselves which may modify any given treatment.

We know that tuberculous virus is often annihilated or destroyed by the vital activity of the gland. Extirpating the glands under such conditions means to deprive the organism of its defenses, and hence to facilitate the thing we are trying to avoid—general infection.

We have seen general tuberculosis ending fatally from extirpation of tuberculous glands of the neck in two cases. In the first case a young man of 21 was operated on in 1893, he presented at that time evident symptoms

of pulmonary tuberculosis. The extirpation of the glands was rapidly followed by an aggravation of the morbid phenomena, and the patient succumbed at the end of six weeks, with all the symptoms of acute exacerbation of the tuberculosis.

The second case was in an adult of 27, who, at the time of the operation (1896), showed no symptoms of pulmonary tuberculosis. Some time after acute miliary tuberculosis manifested itself and carried off the patient in a few days. Cases of this sort are probably not very rare, and their genesis is somewhat easily explained. The tuberculous virus absorbed from the primary focus, after extirpation of the glands, no longer finds any defensive barrier to its progress into the thoracic duct.

We believe it is irrational in many cases to remove tuberculous glands, and the same holds good for glands with cancerous metastases. Above all, in case of small glands, but slightly painful and not causing any inconvenience, infected from an inaccessible source, the latter being true, we believe intervention is contraindicated. Nevertheless there are cases where, even under unfavorable circumstances, intervention is not only useful, but sometimes even formally indicated.

It is proven that the gland offers an extremely poor soil for bacterial development, for bacteria can only multiply when the gland has lost all its resistance; in other words, when the suppurating gland has lost its value as a defensive organ and itself is dangerous, its extirpation is imperative. It goes without saying that intervention may be legitimate under special circumstances, such as large size, or pain or other untoward symptoms produced by the glands. The indication here is for symptomatic and palliative treatment. It is evident, also, that the general state of the individual will enter into the decision more or less.—Ann. Soc. Belge de Chirurg, 1898, 282.

In an emergency operation in which it is necessary to operate under anæsthesia, shortly after the patient has eaten, wash out the stomach, if possible. It is not usually best, if no stomach tube is at hand, to cause emesis, excepting in children, as adults who have just vomited take the anæsthetic badly, and emesis is a trying ordeal for most adults. —Int. J. Surg.

Medico-Legal Notes.

Carriers.

Where a passenger returning to train after stopping at a station for dinner, and thereafter leaving train and going upon platform, was injured by defects therein, held that he was not, as a matter of law, guilty of contributory negligence. St. Louis & S. F. Ry. Co. v. Coulson (Kan. App.) 54 Pac. 2.

Damages.

One thousand dollars for permanent personal injuries affecting the nerves, and causing neuralgia and headache, held not excessive. Atchison, T. & S. F. R. R. Co. v. Lee (Kan. App.) 54 Pac. 4: Plaintiff may recover reasonable damages for pain, loss of earnings and permanent injuries. Mills v. Wilmington City Ry. Co. (Del. Super.) 40 Atl. 1114.

Death.

A mother cannot recover for the death of her son without showing that he contributed to her support. Middle Georgia & A. Ry. Co. v. Barnett (Ga.) 30 S. E. 771; Clay v. R. R. Co., 84 Ga. 345: Measure of damages is such sum as deceased would probably have earned during remainder of his life, and which would have gone to his next of kin. Maxwell v. Wilmington City Ry. Co. (Del. Super.) 40 Atl. 945.

Death by Wrongful Act.

Damages for Injury to Child.—Allegations that a child less than two years old was capable of rendering services to the parents by doing errands and performing services about the house, such as bringing in coal and caring for a younger child, are held, in Southern R. R. Co. v. Covenia (Ga.) 40 L. R. A. 253, to be insufficient to state a cause of action for the loss of the child's services, as the court will take judicial cognizance of the fact that such a child is incapable of rendering valuable services.

Master and Servant.

Master is liable for death of a servant resulting from negligent failure to furnish a safe place in which to work. Middle Georgia & A. Ry. Co. v. Barnett (Ga.) 30 S. E. 771.

Master and Servant.

Liability of Former for Medical Treatment of Latter.—An employer who took an injured

employe to a hospital and agreed to pay for his treatment is held, in St. Barnabas Hospital v. Minneapolis Internat. Elec. Co. (Minn.) 40 L. R. A. 388, to have had no right to cancel his engagement for the care of the servant until the latter could be removed without serious danger to life or health.

Negligence.

Where there is contributory negligence, the proportion of negligence to be attributed to each party will not be measured. Brown v. Wilmington City Ry. Co. (Del. Super.) 40 Atl. 936: All persons using a highway must exercise reasonable care to prevent accidents. Maxwell v. Wilmington City Ry. Co. (Del Super.) 40 Atl. 945: Plaintiff guilty of negligence may recover for defendant's negligence, where the injury was caused by failure of defendants to use ordinary care, after knowing plaintiff's danger. Maxwell v. Wilmington City Ry. Co., supra; Shear & R. Neg. Sec. 99; Jones v. Belt, 8 Houst. 562; Ford v. Charles Warner Co. (Del Super.) 37 Atl. 39: Where there has been mutual negligence and negligence of each party was the proximate cause of the injury, an action therefor will not lie. Maxwell v. Wilmington City Ry. Co., supra.

Negligence.

Where, under the evidence, only one conclusion can be drawn therefrom, negligence is a question for the jury. St. Louis & S. F. Ry. Co. v. Coulson (Kan. App.) 54 Pac. 2: Defendant is liable only for such negligence as is the proximate cause of the injury. Mills v. Wilmington City R. Co. (Del Super.) 40 Atl. 1114: The burden of proof is on the party charging negligence. Mills v. Wilmington City Ry. Co., supra.

Railroads.

As great care is incumbent on operatives of a train passing along a public street as at a crossing. Houston & T. C. R. R. Co. v. Laskowski (Tex. Civ. App.) 47 S. W. 59: Where a child seven years old went on a crossing in view of the flagman while the gates were lowered, it became the company's duty to use care to prevent injury to the child. Jones v. Harris (Pa.) 40 Atl. 791: It was not negligence per se for a locomotive engineer to blow the whistle while passing, immediately under a street viaduct on which a person was driving. Farley v. Harris (Pa.) 40 Atl. 798.—Chicago Law Journal.

Intoxication and Negligence.

It has been held (Kingston v. Ft. W. & E. R. R. (Mich.) 40 L. R. A. 121, that intoxication of a passenger standing on the running board of a car does not absolve the company from exercising care toward him. It will not prevent him from recovering damages from carrier's negligence.

Damages for mental anguish, independent of and unaccompanied by physical injury of any kind, are denied, in Peay v. Western Union Telegraph Co. (Ark.) 39 L. R. A. 463.

Extracts and Abstracts.

Surgical Interference in Cerebral Injuries without External Lesions.

By Ernest Laplace, M. D., LL.D.

It has been aptly said that "no injury to the head is too slight to be despised, or too severe to be despaired of." In view of the truth of this assertion it becomes evident that the utmost caution should attend the treatment of every case of injury of the head. In the vast majority of cases nothing but contusion of the scalp, or possibly a little cerebral concussion, follows the injury. But knowing that a severe lesion to the brain may exist without any trace of it on the skull or scalp, we cannot realize the true nature of the injury, even if the external lesion be very slight, or absent. Generally, impaired function relating to consciousness, or more or less complete paralysis, draws our attention to actual injury of the brain. This will, from the first, characterize the case as of more than ordinary importance, and would guide us to exercise proper caution in the treatment.

My purpose in this paper is to draw attention to the frequency of serious damage having been done to the intracranial tissues without any very apparent evidence of it at the time of, or immediately following, the injury. Numerous examples exist of fracture of the inner table of the skull, following traumatism without any direct external evidence of it. This occurs mainly in the region of the meningeal artery, so that a hæmorrhage may develop some time after the accident, no trace of which exists immediately after the injury. Hæmorrhage may also result from rupture of a sinus, with almost the same results. The contusion of the brain, which necessarily accompanies any violent injury of the skull, may not manifest itself at first. Owing to the swelling, and disseminated compression resulting from the contusion, it is a wise practice to consider all cases of injury to the skull as dangerous until distinctly proved to be the contrary. Inasmuch as

time is the main element to ascertain this fact, all injuries to the skull should be treated with the same circumspect care that would be required in a case of greater gravity. First, absolute rest in bed, perfect quiet, following the indications as to strengthening the pulse. If shock should have depressed the system, warmth should be assiduously applied to the whole body by means of hot-water bottles. With these precautions we await developments, and are ready to meet the course which the case may present. We are then prepared to note the first evidences of impaired functions in the limbs, determining the location and amount of increasing hæmorrhage. We can then follow out the symptoms that may develop from any latent diathesis. We feel convinced that if this simple rule were followed in all instances, even in those in which all evidence of injury is limited to a scalp wound, there would be fewer accidents from hæmorrhage in the brain discovered too late. Low forms of meningitis or cerebritis following injury would be discovered at their inception, and the proper treatment applied, and many cases of subsequent insanity and epilepsy avoided. In support of these views I present several cases which have come to my notice within the last few years, and which demanded timely interference of surgical procedure. This was only possible because of the patient having been given the benefit of the doubt, and having been kept under personal observation.

Case I.—Unfortunately, this first case was one which, by its fatal result, indelibly impressed upon me the foregoing rule. A boy, 10 years of age, while at play with companions, fell upon a curbstone, inflicting to all appearances a slight scalp wound. He was taken to the Medico-Chirurgical Hospital by his sister to have his wound dressed. There was no evidence of fracture; the boy had not lost consciousness, and complained of no pain. The wound being dressed, the boy was urged to remain in the hospital 24 hours, as is the rule of the institution in such cases. Nothing would convince the child to take our advice. He was, however, released only after calling bystanders to witness that his act was contrary to our wishes. On returning home he complained of a slight headache, and was put to bed. He apparently fell into a gentle sleep, which in four or five hours was accompanied by pronounced stertorous breathing. Being alarmed, the parents sent for the surgeon who had attended him at the hospital, but before his arrival the child had expired. The coroner's inquest revealed an extensive hæmorrhage from the middle cerebral artery. Death occurred 10 hours after the injury. Had the child remained under observation in the hospital, the first symptoms of developing paralysis would probably have been noticed by the nurse, and proper surgical interference, with ligation of the bleeding artery, would possibly have saved the child's life.

Case II.—A man, aged about 40, was brought to the Medico-Chirurgical Hospital, in May, 1894, having fallen a distance of 20 feet; he was severely contused about the body, and complained of a slight pain about the right temporal region. Upon being put to rest in bed, and awaiting the result of his injuries, he seemed to rest quietly, until six hours after admission, when a numbness appeared in the thumb of the right hand, that is, the side of the injury. Together with these symptoms, headache increased, and a general sense of discomfort, and he began to toss about in bed. Within two hours, numbness had extended to the whole hand and crept up the arm. The pupils were not dilated, and the respiration and pulse were about normal. Soon an impediment in his speech developed. Finally a numbness in the legs developed, while by this time the hand had become fully paralyzed. The temperature six hours after the accident, that is about the time paralysis manifested itself in the lower extremities, began to rise rapidly, and reached 104° F. The diagnosis of hæmorrhage from a branch of the middle cerebral artery was made. This was suspected in view of the fact that the paralysis had been very gradual, but had completely impaired the functions of the limbs affected. The hæmorrhage was located on the side opposite to the injury, judging from the impaired function. (This condition exists much more frequently than is suspected, as a result of concentration of force on the side of the skull opposite to that upon which the force is applied.) The man was anæsthetized and trephined on the left side, at a point corresponding to the lower portion of the fissure of Rolando. A dark-bluish, shiny spot presented itself, bulging through the trephine-opening. It was apparent that a clot existed under the dura mater. This was incised and a mass of red, clotted blood, amounting to about two tablespoonfuls, was removed, but following upon this the hæmorrhage was copious, and its source could not be seen. The wound was rapidly packed with gauze, and by means of the rongeur forceps the opening into the skull was enlarged, and the dura mater further incised. A smaller branch of the middle cerebral artery was found to have been ruptured, and from it blood exuded in spurts. The bleeding vessel was secured and ligated with fine silk. Although quite depressed at the time the incision was made in the dura mater for removal of the clot, the brain soon expanded and resumed its normal condition

by the time the operation was ended. The dura mater was sutured with silk, the scalp was closed, and a small drain of iodoform gauze inserted. The patient recovered from the ether without much evidence of the shock. The paralysis, however, had not disappeared to any extent, although headache had diminished very much. In about 24 hours, however, the man noticed that he could move his affected leg better than before the operation. His arm and hand did not materially recover usefulness until eight days after the operation. He left the hospital three weeks after the operation, still complaining of some numbness on the affected side of the body, not, however, impairing the usefulness of the hand or leg.

Case III.—W. R., colored, aged 26, was taken to the Medico-Chirurgical Hospital, on June 6, 1897, having received a blow on the back of the head during a brawl. He had been stunned, but soon recovered consciousness. He walked into the hospital, and, though quite a swelling could be felt on the occipital portion of the head, there was no external evidence of fracture. He was put to rest. His temperature rose to 103° F., the pulse was bounding, and the right pupil became dilated. There was great jactitation. Delirium appeared; there was, however, no paralysis. It was evident that the patient suffered from a severe contusion of the brain, with more or less pronounced capillary hæmorrhage, producing generalized compression. He was etherized, and a large trephine opening was made over the site of the injury, in the parietal region. Intense congestion of the dura mater was found, but no hæmorrhage. The membrane was very tense. The wound was carefully packed with gauze. The patient, on recovering from the ether, was less irritable than before the operation. The next day consciousness gradually returned. Symptoms disappeared, and he made an uninterrupted recovery. Here we evidently dealt with a pronounced case of contusion of the brain, which, perhaps, had not the swelling been reduced by the operation, would have led to serious complications, following upon the edema.

Case IV.—F. J., a male, aged 26 years, possessing but one arm, fell from his bicycle, striking his head on the curbstone. He was brought to the Medico-Chirurgical Hospital in an unconscious condition, though the scalp showed no special lesion. He was apparently in a deep sleep. His limbs were completely relaxed, though not paralyzed. Respiration was diminished, the pulse about normal. The conjunctiva was insensible, and the pupils did not react to light. Deglutition was difficult. The patient remained in this condition about four hours, after which his unconsciousness was accompanied by stertorous breathing; there was involuntary emission of urine, and inactivity of the pupils. The symptoms became aggravated during the following day. It was evident that a severe contusion of the brain was the cause of his condition. Accordingly the patient was trephined on the right side of the skull at a point where edema of the scalp was manifest, and where probably the head had been struck. The dura mater appeared congested, and an incision was made in it, giving outlet to a large amount of cerebrospinal fluid. The brain itself seemed very much congested; the wound was packed with sterilized gauze, and the patient put to rest. Next morning the dressings were found saturated with a serous fluid, no doubt consisting of both serum and cerebrospinal fluid. About 48 hours after the operation the patient began to show signs of consciousness. He had forgotten, apparently, all the knowledge he had ever acquired, and while he recognized friends, he had forgotten their names, as well as the names of objects about him. In the course of two weeks, from the constant conversation with the patients about him, he finally acquired a new knowledge of the names of ordinary objects. His limbs gradually regained motion and sensibility during the first week after the operation. I saw the patient three months afterward, and though he seemed to still possess a certain amount of mental hebetude, he was free from pain, and had already returned to work. The striking feature of this case was the large amount of drainage which took place into the dressings daily. The wound to the scalp was not sutured until this drainage had lessened in amount. I think that this patient would have probably remained unconscious for an unlimited time had not the pressure upon the brain been relieved by the serious amount of force brought to the head will necessarily be conveyed to the brain and result in an injury more or less serious to this organ. Its delicate structure, its intricate supply of blood vessels, its mobility in drainage that followed the operation.

These four cases show the necessity of prompt intervention in traumatisms of the head. I do not mean that trephining should be resorted to in all head injuries, but that a the skull, all favor its contusion against the skull when force is transmitted through it. The blood vessels, few or many, large or small, may rupture, and according to the number, size and location of those injured will symptoms follow that will produce, sooner or later after the accident, impaired function of the area of the brain injured.

Injuries to the head, therefore, whether serious or not, should be kept under strict observation for at least 24 hours. If at any

time subsequent to the injury there should develop symptoms of impaired function, immediate application should be made to the brain of the principles tending to relieve intracranial pressure. The pressure may be localized, as by a clot from a bleeding vessel. It may be general, from the edema following a more or less extended contusion. The indication should be fulfilled by trephining, opening the dura mater, and draining according to the necessities of the case.

It is no doubt possible that recovery may eventually take place in some cases without surgical intervention. But it is certain that having drained carefully, recovery will be much more rapid, and less likely to be attended by permanent after-effects. When absorption takes place without drainage, fibrin and leukocytes remain in situ, predisposing to later dangers—epilepsy and insanity.—Philadelphia Med. Jour.

A Surgical Essential.

By J. P. Webster, M. D.

Nearly every physician, whether in the country or in city, is frequently called upon to do emergency surgery where there has been great loss of blood. Too many of these cases in the past have been left to die, or ingested with strychnin, digitalis, or even whisky, under the mistaken idea that the chief danger was from shock rather than exsanguination, when the prompt injection of a quart or two of the normal salt solution might have saved their lives. I wish, therefore, to report the following cases through the columns of The World, in the hope that they may be of some service to the general practitioner.

I would emphasize the fact that wherever blood is needed, and needed quickly—even as the Texan is alleged to need his revolver at time "with an urgency amounting to profanity"—in all such cases there is no resource like the normal salt solution.

Timothy ———, age 34, of splendid physique, a switchman in the employ of the Erie Railroad, was brought to the hospital one evening about 8 o'clock, his left leg crushed to a pulp just below the knee. A rude tourniquet consisting of a clothesline and a short stick had been applied, but the patient had evidently lost considerable blood. When I arrived at the hospital an hour later he was nearly pulseless, and even the conjuctivæ were pale. Little or no bleeding followed the removal of the tourniquet. One hypodermic of strychnin had been given him, but he had rapidly become unconscious. Accordingly the leg was simply amputated with a scalpel, the rough stump irrigated and the larger vessels tied. Then a proper tourniquet was applied, low down, followed by a loose cotton dressing, bandaged tightly.

Meanwhile the injection of normal salt solution had been begun. I use a fountain syringe with a needle about the size of that on the antitoxin syringe. During the first three-quarters of an hour the patient was given two quarts, and the circulation began to rally, as shown by the character of the pulse and the general appearance of the patient. One pint of the solution was given every two hours thereafter for 30 hours, pains being taken to regulate the pressure by avoiding hanging syringe too high.

The needle was placed alternately in the lateral femoral region and under the mammæ. The following afternoon the circulation had become restored, ether was given, and amputation was made above the knee. The patient is now on the high road to recovery.

Charlie M——, age 8, was brought in by the police patrol with a leg and an arm crushed by a locomotive. He was unconscious, exsanguinated and pulseless. Normal salt solution was given as in the foregoing case, and operation took place within three hours; the thigh being amputated at middle of the lower third of the femur, and the arm close to the insertion of the coraco-brachialis. The injection of the salt solution was continued during the operation.

He rallied after the operation, but would frequently become pulseless and unconscious. At such times he was given the salt solution and immediately the pulse would become strong, the mind clear and respiration regular. The solution was used every three to five hours, fifteen quarts being given altogether within the five days following the operation. He made a prompt recovery.

Mary ———, age 30, a typhoid patient, suffered a hæmorrhage from the lungs on the 18th day of her illness. This was consequent, I believe, on a bronchial typhoid ulcer. The quantity of blood lost was considerable. Symptoms were similar to the preceding, and results, on giving the normal salt solution, were fully as satisfactory and complete.

I might go on with the testimony, but enough has probably already been said to call its consideration to the attention of the general practitioners, many of whom will doubtless confirm what I have said.

The manufacture of the normal saline solution is very simple. One teaspoonful of common salt is used to a pint of water, and this is boiled ten minutes and strained, and is injected at a temperature of about 98 degrees or 100 degrees.

I would add that I have lately returned from a visit to the Johns Hopkins Hospital, and that while there, in all my stay of several

weeks, I saw no strychnia injections used; nothing, in fact, save the normal salt solution, before, during and after an operation, when a stimulant was required.—Med. World.

The X-Ray "Burn"—Its Production and Prevention—Has the X-Ray Any Therapeutic Properties?

By Charles Lester Leonard, A. M., M. D.

The numerous reports from foreign sources which ascribe to the X-ray therapeutic properties and detail results produced in cases of cancer and lupus vulgaris, as well as claim for it a retarding action upon the growth of bacteriological cultures, have led the author to study the electrical conditions present, to determine whether the results obtained can not be more reasonably explained by the action of forces which are always present, and the physical and physiological properties of which are perfectly known and understood.

The following cases in which the X-ray was employed with the purpose of producing a therapeutic action serve as illustrations and confirm the opinion which the author has frequently expressed, that the X-ray burn and its so-called therapeutic action are not due to the participation of some unknown quality of this partially known source of energy, but are the results of the destructive action of the electric currents or static charge induced in the tissues of the patient.

The first case was a recurrent carcinoma of the axilla following an incomplete operation. The case was inoperable, and it was decided to test the therapeutic value which has been claimed in various quarters for the Röntgen ray. A Queen self-regulating tube energized by a "fat" eight-inch spark was placed at a distance of about six inches from the field upon which it was desired to act. The surrouding tissues were protected by sheets of lead. A "grounded" sheet of aluminum was placed between the tube and the patient, in order to eliminate from the observation the action of the static charge of electricity produced by the strong induction field which surrounds the tube. The static charge was thus collected in the aluminum shield and conducted by the grounding wire to earth.

The series of exposures, averaging twenty-five minutes each in length, was continued daily for three weeks. The therapeutic action of the X-ray in this case was entirely wanting, and no X-ray "burn" was produced either immediately or later.

The second case was one of lupus vulgaris, in which, in contrast to the former case, the supposed burning effect of the X-ray was desired for its cauterizing action.

In this instance the "grounded" aluminum sheet was purposely omitted to permit the accumulation of the static charge upon the skin, so that it might produce the desired effect. The parts surrounding the field of operation were protected by sheets of lead, and all the other factors were identical. The exposures were only twenty minutes in length and were employed for ten days only. The only difference, therefore, was the omission of the grounded aluminum protector with shorter exposure.

The result was strikingly different. Although the exposures were not as long, and were continued for less than half the number of days, there was produced a severe "burn," followed by deep ulceration of the area acted upon. This burn was produced by the static charge which had not been eliminated by the use of a shield, and extended not only over the exposed area, but also to a less extent over the parts protected by the sheets of lead.

That the action of the Röntgen rays is not interfered with materially is shown by a third case, where a burn was produced in skiagraphing a patient for a vesical calculus without the employment of the shield. A burn was produced of considerable extent, but not severe in character. After it had healed, a second skiagraph to determine if all the stone had been removed was made under identical conditions, except the interposition of the aluminum shield. There was no burn produced, and the negatives in the two instances, before and after the removal of the calculus, were equally good in detail and definition, showing that the Röntgen rays had acted equally well whether the shield was or was not employed.

The evident deduction from the results produced in these cases is, that the X-ray "burn" and the therapeutic action attributed to the X-ray are not produced by the X-ray, but are the result of the action of the static charge, which in two of the cases cited was collected in the aluminum shield and conducted to earth by the grounding wire.

The author has never seen a burn produced where the shield has been used.

In a previous paper the author has said: "It would seem more reasonable to ascribe the changes commonly known as X-ray 'burns' to the action of an agent which we know is always present when they are produced and is capable of producing them, rather than to a hypothetical action of the Röntgen rays of which the physical nature and characteristics are not yet entirely known."

The Röntgen ray itself is dependent upon the high potential current induced in the secondary circuit of the induction coil for its production, and therefore depends upon the physical law of induction. This law makes it certain that the patient's tissues, as conductors

of electricity, will have induction currents or static charges induced in them if they enter the high-potential induction field which surrounds the X-ray tube.

It is well known that electricity has at first a stimulating, and finally a destructive, influence upon tissues through which it passes. It is therefore probable that the X-ray burn is the result of an interference with the nutrition of the cells produced by the static electric charges or currents which are induced by the introduction of the patient's tissues into the high-potential induction field surrounding the tube.

All the therapeutic activity which has been ascribed to the X-ray is readily explained by these static charges and their action, which is well known to electro-therapeutists.

The action attributed to the X-ray in retarding the growth of bacteriological colonies is a well known property of static electric charges. In this case the gelatin serves as the conducting material in which the electricity is collected, while the glass plate is the non-conductor which prevents its discharge.

The method of protecting patients from the injurious effects produced by these high-potential induction fields has frequently been described by various authors who have successfully employed it, yet a sufficient knowledge does not seem to be widely distributed. It is of vital importance that it should be appreciated and universally employed. The X-ray method of diagnosis has a value which as yet is but poorly appreciated, and anything, such as the fear of burns, which in any way hinders its employment hinders progress.

It should be distinctly understood that the interposition of a "grounded" conductor of electricity that is penetrable by the X-ray, as a thin sheet of aluminum, or gold leaf spread upon a large cardboard screen, will absolutely protect the patient from burns.

Conclusions.—The X-ray "burn" is, therefore, not the result of the action of the X-ray, nor can it be produced by the X-ray; but the dermatitis produced is the result of the static currents or charges induced in the tissues by the high potential induction field surrounding the X-ray tube.

The therapeutic properties attributed to the X-ray do not belong to it, but are due to the static charges and currents induced in the tissues, which have long been known to be capable of producing similar results.

The X-ray per se is incapable of injuring the tissues of the patient, and the dermatitis, which has been called an X-ray "burn," is the result of an interference with the nutrition of the part by the induced static charges.

The patient may be absolutely protected from the harmful effects of this static charge by the interposition between the tube and the patient of a grounded sheet of conducting material that is readily penetrable by the X-ray—a thin sheet of aluminum, or gold leaf spread upon cardboard, making an effectual shield.—N. Y. Med. J.

Asks Damage for X-Ray Burns.

New York, September 13.—Max Meyer, the right side of whose face was burned by X-rays, has sued his late employers for $10,000 damages for this and injuries to his right hand, suffered also from the rays.

Meyer was employed by the United States Electrical Supply Company when the electrical show opened in the Madison Square Garden in May. He exhibited the X-ray apparatus, showing the manner of using it.

"I was not told of the danger in the X-rays," said Meyer to-day. "I thought they were harmless. There was no device to protect me, although a shield was made after I left. When at work I noticed a curious itching of my right hand. Then my hand began to puff up and get red. About the same time the right side of my face began to itch. I went to a physician and showed him my hand and face.

"'You are pretty well broiled,' he said. 'It is an X-ray burn.'

"Then my hair began to fall out. My mustache came out as cleanly as if it had been cut off with a razor up to the middle line of my lip. My skin began to shrivel, and then every hair on the right side of my head and face seemed to come out by the roots."

In his complaint Meyer alleges that the electrical supply company was guilty of negligence.

Gunshot Injuries in the Late Greco-Turkish War.

It is almost true to say that all bullet wounds, except those limited to the soft structures, result in fracture of bones. If there is any breach of surface, it is of necessity a compound fracture, and is the most unfavorable form of any kind of bone injury, for (1) the wound is an infected one; (2) it is devoid of drainage, owing to the long sinus left by the track of the bullet; and (3) the hygienic surroundings are invariably bad. When a joint is opened by a bullet it communicates with the exterior, and being exposed to all the ordinary infective sources, it suppurates. A fractured olecranon, a fractured patella, and an impacted Colles' fracture are fractures into the joint, but suppuration does not occur unless contamination is admitted to the seat of injury.

If I were asked what were the points that struck me most in injuries of this kind (for with the exception of a few revolver and gun-

shot wounds which I had seen in hospitals my knowledge on the subject was very limited), I should say that I was at first surprised at the comparatively little damage done by rifle bullets. In some cases, it is true, it was enormous, but in the majority of wounded men the ball had passed straight through the part struck, leaving a tiny, bluish-black hole at each end, resembling to my mind a magnified leech-bite wound of about three days' standing. In most of the cases it was impossible to tell by the appearance of the wounds which was the hole of entry and which was that of exit; the patient himself could rarely say, and it was only by ascertaining his position when struck that this could be determined. Some of the edges of the entry were inverted, but not all; some, especially the oblique wounds, were round and gaping. The wounds of exit in many cases seemed the same as those of entry; a few, however, had everted edges. Superficially the wound is nearly always smaller than the bullet producing it. This has been accounted for by the great twist there is on the ball at the time, like the screw on the turning point of a gimlet. But is that really so? I should say that a bullet traversing the whole body would not revolve on its long axis more than, at the most, half a turn, unless it is arrested in the tissues, when theoretically it would spin like a top; hence the area of the internal wound often bears no proportion to that of the external wound. If an express bullet be fired into a thick board it will hardly be possible to pass even a wire down the track of the ball. I asked nearly every wounded man I saw in the war, however slight the wound, excepting perhaps grazes and hand wounds, whether he was knocked over when struck. This seemed to be invariably the case. When hit, he experiences the sensation of a sudden, heavy blow. If wounded in the head, trunk, or lower limbs, he does not fall forward as one sees on the stage, but collapses and sinks to the ground, turns pale, sweats, and often vomits. All this may be due to the mental shock, or the consciousness that he has at last succumbed. The ball rips through the tissues, carrying in pieces of cloth or other foreign bodies, which are left in the bullet track, leading to suppuration and the formation of a troublesome sinus, and requiring the continual "tinkering" which is characteristic of these wounds.—Gaillard's M. J.

Relief of Traumatic Insanity Due to Depressed Fracture of the Skull, by Extensive Trephining.

Case reported by John Donley, clinic of Dr. W. J. Means, Professor of Surgery, Ohio Medical University.

Mr. A. A., white, native of Ohio, age 43 years, 5 feet 5 inches high, married, a farmer and a resident of New Moorefield, Ohio.

On December 4, 1892, he was waylaid and struck with a common hay fork on the left side of the head over the parietal bone. The force of the blow produced a fracture that covered an area along the line of the fissure of Rolando, three inches long and two inches wide, with a depression of the central fragment to a depth of three-fourths of an inch.

After being struck, he remained unconscious for some hours and when consciousness was restored, he showed marked nervous phenomena. Hearing on the side of the injury was almost destroyed, the sight was dimmed and there was ptosis of the left eyelid; gastric disturbances were pronounced. He was easily excited, very irritable and at times irrational. He had no power to reason and his memory was poor. There was difficulty in articulating, and would get his words reversed and badly mixed. The history shows that he remained in this condition for more than two years, some days better and some days worse. His gait was uncertain, caused mainly from motor trouble on right side.

During the remaining three years some of the symptoms disappeared while others grew worse. His attending physician, Dr. Brinkman, of New Moorefield, recommended an operation. On the 30th of March he was brought to the Protestant Hospital, and the following day was operated upon.

The condition of the patient before the operation was as follows: Severe pain on left side of head; deafness in left ear; head drawn to left side and forward; ptosis of left eyelid; partial motor paralysis of right leg and arm. The morbid mental phenomena were very marked. He was unable to talk coherently, both from word aphasia and loss of memory. He had no appetite and was very much emaciated.

The patient's head had been shaved and carefully cleansed. Chloroform was used as the anæsthetic. A large V-shaped flap, including the integument and periosteum was raised over the depressed area. Hæmorrhage was very profuse from the blood vessels along the margin of the fracture, when the periosteum was lifted and could only be controlled by plugging the openings. An opening was made through the skull with a trephine, then the depressed bone was removed with the rongeur bone forceps, chisel and mallet. At one point a spicule of bone had penetrated the dura and was producing considerable irritation in the brain substance. When the depressed bones were removed, the brain assumed a normal position. The opening in the dura was closed with catgut sutures. The bleeding sinuses along the margin of the opening were closed by depressing the outer and

inner tables with the rongeur forceps. The flap was sutured in position and patient put to bed. Following the operation he suffered from nausea for 48 hours. Other than this there were no untoward symptoms. The patient had immediate relief from the pain in his head. The other conditions mentioned in the history gradually improved until his discharge from the hospital April 15. His appetite was good, mental condition restored and the motor trouble almost entirely relieved.—Columbus Med. Jour.

A Case of Depressed Fracture of the Skull Successfully Treated by Trephining.

Dr. Charles J. Proben presented a case of this kind. The patient exhibited was a boy six years of age, who had been well until the accident occurred, January 15, 1898. On that evening at 8 p. m., while sliding down the balusters astride, he lost his hold and fell three flights of stairs, apparently striking his head against the projecting post at the bottom. The concussion must have been intense, the noise of the fall having been hear throughout the house. The injured one was stunned and faint when he was picked up. To the casual observer it was at once evident, from the appearance of the hollow in the head, that he had sustained a fracture of the skull. The patient was carried to his apartments and the nearest physician summoned, who declined to interfere and advised sending the little one to the hospital. Three hours later the speaker found his condition as follows: The boy was conscious; his skin was pallid and cold; the pupils were dilated, reacting to light; the pulse was slow and weak. Slight nausea supervened. No signs of local or general paralysis could be elicited; no paræsthesia or anæthesia; knee-jerks somewhat exaggerated. The evidence of the injury, however, was predominating; a depression of the scalp in the temporo-occipital region was distinctly visible twenty feet away. It was elliptical in shape, covering an area three inches by an inch and a half, and accompanied by œdema and extravasation. However severe the force might have been, none but a slight abrasion of the skin was produced. The indication for operative interference was practically decided at a glance; but, owing to the absence of any alarming symptoms and the lateness of the hour, it was decided to wait until better means for operation could be obtained. Under the effects of sedatives and local ice applications a fairly restful night was obtained. In the morning the scalp was thoroughly shaved and well scrubbed, chloroform being cautiously administered. Palpation revealed some œdema of the tissues with a depression in the skull plate quite extensive in area. A semicircular incision was made, keeping away from the fracture, so that any subsequent scar would not press upon the replaced bone. This revealed a loosened pericranium, with a fracture underneath, oblong in shape (three inches by an inch and a half), with the bone cracked at the edges and in the centre, producing a wedge-shaped depression estimated at about three quarters of an inch. Trephining was decidedly indicated, and an opening posterosuperiorly effected in order to raise the bone. Many fruitless attempts at elevation were made until it was decided to trephine below and work from both openings; even this proved ineffective until the lower opening was enlarged, making a wedge-shaped cut running into the centre fracture. The bone could then be raised and replaced almost level with the skull plate. The brain substance appeared hæmorrhagic from extravasation beneath the dura, which was intact save for scratches occasioned by a few splinters and an accidental incision produced by the trephine. Some of the brain tissue exuded and hæmorrhage occurred, which was only controlled after suturing the edges of the dura together and compressing the brain substance underneath. In order to coapt the retracted dura, the upper opening had to be enlarged by the rongeur. The button of bone was then replaced over this area, and was kept in place by two silkwormgut sutures applied so as to meet at right angles over the center of the bone. This was very effective and helped to retain the button after suture of the scalp until it had become united. A large, firm compress was used and a bandage with much padding to envelop the head. This was removed at the end of a week and primary union found to have taken place, except at a small spot used for drainage. Practically no shock or any untoward symptoms developed, save a little irritability of the bladder, which persisted for two weeks—in fact, the patient felt so well that it was difficult to restrain him from getting up after the first week. Four weeks practically completed the cure; the bone button was found to have become tight at about the third week. Now, three months since the operation, no symptoms of brain irritability had developed. He was able to play and run about without harm, and nothing was noticed but a pulsation at the spot where the button was not replaced.

The question had at first suggested itself, What was it best to do—trephine at once, or wait for secondary symptoms to appear? The speaker immediately, not to his sorrow, chose the former, and performed rather a preventive trephining, without waiting for symptoms of depression, inflammation, or epilepsy to develop. The evidence of the injury was so great that really the only practical alternative

was to trephine and elevate the bone. That no signs of paralysis could be elicited was apparently due to the remoteness of the depression, encroaching but slightly on the motor area of the brain. The chance of subsequent epilepsy developing was almost a foregone conclusion had not operative procedure relieved the depression.

Dr. W. L. Stowell said he thought that Dr. Proben was very fortunate in this case to have a complete recovery after so extensive a depression. The speaker did not quite see how such an extensive area could have been depressed without giving rise to some more pronounced symptoms.—N. Y. Med. Jour.

Compound Dislocation of the Elbow.

By A. C. Ames, M. D., Hubbell, Neb.

The following case that recently occurred in my practice I believe to be of enough interest to be worth reporting, as it illustrates the result that may often be obtained by a conservative treatment of grave accidents.

R. J. M., male, aged about 30, weight about 190, of a rather lymphatic temperament, sedentary habits, unaccustomed to hardships or suffering, was thrown from a buggy August 29, 1897, by a runaway horse. While unable to tell just how he struck the ground the probability is that his arms were extended to break the fall, and that his wife, who was with him, fell upon his left elbow, thus forcing the arm into a position of hyperextension and dislocating the humerus at the elbow forward, producing not only a laceration of the ligaments but of the fascia and skin as well, and a separation of the other structures and a protrusion of the whole articular extremity of the humerus to the extent of about three inches, passing through the sleeves of his coat and two shirts into the ground enough to become infected with the dust of the street.

The accident occurred immediately in front of my residence and he was at once helped into the house and put to bed and a messenger sent for me, five miles in the country, and a telegram for Dr. M. W. Spohn of Chester, seven miles away. By the time I arrived a telegram had been received stating that Dr. Spohn would be there in a short time, so I got the dressings ready and awaited his arrival, about half an hour. As soon as he arrived we anæsthetized our patient and proceeded to investigate the wound more thoroughly. We found one small branch of the brachial artery lacerated so as to require a ligature. The other vessels and nerves were intact, and the muscles but little injured, so we decided to attempt to save the arm, which we at first thought would have to be amputated. After washing the wound in antiseptic solutions and getting it as near aseptic as possible, we reduced the dislocation, which was very easy to accomplish, but hard to maintain, owing to the complete destruction of the ligaments. We then inserted a drainage tube into the olecranon fossa and another into the coronoid fossa of the humerus and closed the wound with catgut ligatures, except a place in the back part of the wound near the internal condyle, which we packed with iodoform gauze. We then, after applying the usual antiseptic dressings, placed the arm in a splint, flexed at an angle of about 125 degrees, expecting that if we succeeded in saving it it would be anchylosed, and deeming that position the most useful.

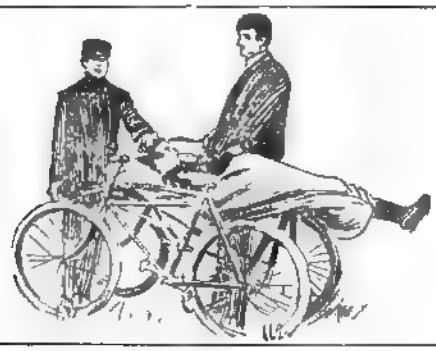
There was considerable pain and shock for a few hours, which were relieved by hypodermics of morphia and strychnia, together with alcoholic stimulants internally and warmth externally. For a few days the temperature was about 100 degrees and the pulse nearly 150, but by the end of two weeks the temperature had reached normal, where it remained, and the pulse had reached about 100, where it continued until his discharge, about November 20. Excepting the rapid pulse rate, there was no evidence of heart disease, aside from some dropsy of one lower extremity and, to a less extent the other, which lasted a few weeks. The wound was dressed every day for a few days, then every second day for about eight weeks, then every third day. At each dressing it was thoroughly syringed out with bichloride solution and all cavities packed with iodoform gauze. There was considerable pus in spite of our best endeavors to prevent it. We kept it in splints and did not allow any more motion than we could help for about a month, as moving it was liable to dislocate it. As the soft parts began to unite we commenced to use passive motion at each dressing, and about November 1 we removed the splints, and from then on exercised it more, although it was all passive motion until his discharge. When last seen, November 21, there was a small sinus discharging some pus. The arm could be flexed to about 75 degrees and extended to about 160 degrees. Rotation was of about half the normal extent. He then went away on a visit and was under the care of another surgeon, who continued the passive motion, and active motion was begun as soon as possible, during which time he continued to improve. At last report, March 1, the sinus had not entirely healed, but he was beginning to be able to use the arm some, and, although he could not get the hand to his face, he could get a fork to his mouth to feed himself. He resumed his position—in a bank—about April 1, and, while his arm was not entirely well, it was still improving.

No doubt he would have recovered from an

amputation much quicker, and with less suffering than he experienced, but the useful arm that he now has certainly more than pays for all that it has cost him to save it, even if it never becomes perfect. Throughout the whole time he was very despondent, and full of fears for the worst and little hope for the better. While he was in a serious condition he imagined himself worse than he was, and would not try to help himself at all, but remained in bed most of the time for nearly two months and could not be persuaded to believe that he was able to get out of it. This affected his general health until he lost much flesh, which no doubt retarded the healing of the wound.—West. Med. Rev.

Another Bicycle Ambulance.

Drs. Blech and Fellows of Chicago started overland for St. Louis on a chainless bicycle



ambulance. They will test it on the country roads and report to Washington the results of their trip. The surgeon-general of the army and the heads of the departments will be furnished with copies of the report. The bicycle ambulance consists of a stretcher between two wheels. It is flexible and made large enough to carry a wounded man from the field of battle. The time allowed for the round trip is ten days.

In order to obtain union by first intention in an operative wound, it is generally important that all bleeding should be checked before the wound is closed. This does not mean, however, that every minor bleeding point should immediately be seized and tied. This delays the operation, and is unnecessary, since pressure and exposure will suffice for all very small vessels. An undue number even of absorbable ligatures, when left in a wound, cannot but act as foreign bodies, even if only temporarily.—Int. J. Surg.

The use of very strong antiseptics rather hinders than promotes the repair of tissues. In an operation wound that has been made under strict asepsis, the less washing out the better.—Int. J. Surg.

Personal.

Dr. F. J. Lutz has entirely recovered from a septic infection received after an operation for cysto-sarcoma.

Dr. George W. Crile of Cleveland, Ohio, was awarded the Senn medal at the last meeting of the American Medical Association. The title of his paper was "An Experimental Research on the Surgery of the Chest and Pleura."

Notes of Societies.

Preliminary program of the fifth annual meeting of the American Academy of Railway Surgeons, to be held at Chicago, Ill., October 5, 6 and 7, 1898:

October 5, 10 a. m.

"Anæsthesia," R. H. Cowan, M. D.

"Traumatic Injuries of Peripheral Nerves," D. S. Fairchild, M. D.

"Injuries of the Genital Organs," Milton Jay, M. D.

October 5, 2:30 p. m.

"The Radical Cure of Hernia," W. J. Mayo, M. D.

"Concealed Meningeal Hæmorrhage," H. Reineking, M. D.

"The Interment of Ericsen," W. J. Galbraith, M. D.

October 6, 9:30 a. m.

"Physical Examination for Railway Service," J. F. Pritchard, M. D.

"The Hygiene of Railway Injuries," G. P. Conn, M. D.

"Conservatism in Railway Surgery," H. Hatch, M. D.

October 6, 2.30 p. m.

President's Address, "The Higher the Order of Railway Surgery the Greater the Protection to the Employe, the Passenger and the Company," R. Harvey Reed, M. D.

"Convenient First Dressing of Fractures, with Samples," E. H. Trickler, M. D.

October 7, 9:30 a. m.

"Surgical Treatment of Some Varieties of Disease of the Prostate and Seminal Vesicles," G. E. Benninghoff, M. D.

The following fellows of the academy have promised papers, but up to date have not furnished subjects for the same: A. D. Bevan, M. D., Allen Staples, M. D., Leroy Dibble, M. D., C. K. Cole, M. D., George W. Crile, M. D.

D. C. BRYANT, M. D., Secretary,
Omaha, Neb.

Railway Miscellany.

Obituary.

E. O. Jones, foreman of bridges of the Houston & Texas Central, died at Ennis, Tex., September 9, aged 67 years.

John Colley, general baggage agent of the Chicago Great Western, died at his home in Chicago, September 12, from typhoid fever.

Wilson Eddy, who was master mechanic of the Boston & Albany from 1850 to 1881, died at his home in Springfield, Mass., September 2, at the age of 85 years.

Edward A. Merritt, chief bookkeeper of the Philadelphia & Reading, died at Philadelphia, September 7, of consumption. He was 40 years of age, and had been connected with the Reading road for twenty-four years.

H. E. Passamore, supervisor of road of the Northern Central at York, Pa., died in that city, September 17, of Bright's disease. He was nearly 64 years of age, and had been connected with the Northern Central since 1859.

Judge Thomas M. Cooley, who was the first chairman of the Interstate Commerce Commission, died at his home in Ann Arbor, Mich., September 12, after a long illness. He was 74 years of age, having been born at Attica, N. Y., January 6, 1824. Judge Cooley was an able lawyer and jurist, and was the author and compiler of many legal works. For twenty years he was one of the judges of the Supreme Court of Michigan, and for many years he occupied a chair in the University of Michigan, and delivered lectures in the law department. In December, 1886, he was appointed receiver of the Wabash, St. Louis & Pacific lines east of the Mississippi river, but resigned that position in March, 1887, to accept a place on the Interstate Commerce Commission. He was chosen chairman of the commission, and occupied that office until September, 1891, when he resigned on account of ill health.

The Southern Railway.

The Southern Railway Company now operates over 5,000 miles of line; the acquisition of the Memphis & Charleston and Knoxville, Cumberland Gap & Louisville railways during the year having brought the total mileage of the system up to 5,231 miles. On several occasions, however, when speaking of the Southern Railway, we have said that it is something more than a great railway company operating so many miles of line. There is a politico-economic and moral side to the great enterprise which makes its success or failure a matter of national interest. When the Southern Company was organized, the work on which it embarked was not merely the operation of a railway, but it was the revivification or regeneration of the whole of a vast section of the United States. Just as when the pioneer railways pushed westward they practically added new states to our Union, so when the Southern Railway was created out of all the miscellaneous lines which went to constitute it, the task which it had before it was the energizing and uplifting of great masses of more or less backward and stagnating people. In all the voluminous report for the year ending June 30, 1898, the most truly interesting item is as follows:

During the year over 200 new manufacturing establishments of various kinds were wholly or partially constructed at points upon the company's lines. The aggregate cost of these plants, together with the cost of additions to existing plants made or begun during the year, is estimated to be over $4,000,000. These new plants include 13 cotton mills, which, together with additions during the year to previously existing mills, will contain about 258,000 spindles and about 2,200 looms. There have been constructed during the year by the company over 12 miles of additional sidetracks to new industries, whose business is, or will be, tributary to the company's lines. These improvements indicate a steady and substantial growth of manufacturing industries in the South.

This is all that is said on the subject, but it is significant and shows that the Southern Railway is doing its appointed work.

The increase of gross earnings during the year was $2,016,338, and in net earnings from operation $747,630. It must be remembered that there was an increase in mileage of some 400 miles of line, as already stated. After paying all expenses, taxes and charges, and 1 per cent on the preferred stock, there remained a balance to credit of $315,121. The company has no floating debt. The maximum fixed charges as provided for in the plan of reorganization have now been reached.

The universal decrease in rates is seen in the statistics of this company. The freight rate decreased .003 cent per ton per mile and the passenger rate .05. Even these insignificant decreases meant a loss on the tonnage moved of $53,100, and of $11,330 on the passengers carried. There was an increase of 2.73 tons in the average tonnage per freight train, the average trainload having been 175.4 tons, and an increase in revenue per freight train mile of seven-tenths of a cent. Yellow fever caused considerable interruption of traffic and no little loss and expense to the company in the fall and early winter of 1897. But the year was, on the whole, something more than satisfactory. The property is evidently being well

maintained and closely operated. In fact, it is, as we have said, doing its appointed work.

Electric Street Railways in Europe.

The United States consulate at Zurich, Switzerland, furnishes to the state department, under date of July 11, 1898, some figures showing the mileage of electric street railways in Europe. The report says:

On January 1, 1898, 204 lines of electric street railways, with a mileage of 2,259.4 kilometers, were in operation in Europe. The rolling stock consisted of 4,514 motor cars.

The following table shows the status of the electric street railway lines in the different countries of Europe:

Country.	Total length, Miles.	Number of Motor cars.
Germany	707.3	2,493
France	246.5	664
Great Britain	97.6	252
Switzerland	90.8	237
Italy	82.8	311
Austria-Hungary	66.1	243
Belgium	42.8	107
Spain	37.9	50
Russia	19	65
Sweden and Norway	14.9	43
Servia	6.2	11
Bosnia	3.5	9
Roumania	3.4	15
Holland	1.9	14
Portugal	1.7	3
Total	1,422.6	4,514

Germany has 65, France 44, Austria-Hungary 13, Great Britain 24, Switzerland 23, and Italy 11 electric street railways.

The system most in use is the overhead trolley, which is operated by 172 lines, while 8 lines have adopted the underground trolley, 8 lines the third-rail system; 13 lines storage or accumulator cars, and 3 lines have a mixed system of overhead trolley and accumulators at certain points of their lines.

Cable dispatches tell of two serious railway accidents in European countries within the past week. On August 11, in a collision between passenger and freight trains near Ponte Decimo, Italy, nine persons were killed and 40 seriously injured. The other disaster occurred on the Western Railway of France near Lisieux, August 14. A crowded excursion train was derailed and the cars were precipitated down an embankment, six of them being wrecked. The casualties included 11 killed and 25 or more seriously injured.

Mr. Patrick Miles has resigned as assistant division roadmaster of the New York Central & Hudson River at Lyons, N. Y., after a service of over 50 years with that road.

Everything to Be Chocolate Tint.

All the stations along the Lake Shore are being repainted in the newly adopted standard color, which corresponds with the chocolate tint of the new coaches. For years the Lake Shore was known as an adherent to the yellow tint, and its coaches were painted in that style until recently. Now the officials have concluded to paint all the freight houses and passenger stations in the same shade, and the painters are at work making the change.

The South Carolina state law requiring railroads to furnish separate coaches for white and colored persons went into effect September 1.

President Burt of the Union Pacific says that the contract for the new passenger depot at Omaha will be let within three weeks, the plans having been approved by the board of directors. It will be located between Eighth and Tenth and Marcy and Leavenworth streets, and will be about 500 feet in length. In addition to the Union Pacific, the Chicago & Northwestern, Chicago, Rock Island & Pacific, Chicago, Milwaukee & St. Paul and Omaha & St. Louis roads will use the new depot when it is completed.

The Baltimore & Ohio and Baltimore & Ohio Southwestern railroads have secured a long lease on the premises at Broadway and Locust street in St. Louis, for the purpose of consolidating under one roof the freight and passenger offices now located in that city. The new location is the ground floor of the American Central building, with 65 feet on Broadway and 85 feet on Locust street. The ticket office will be in the center fronting on Broadway, the freight department on one side and the passenger department on the other, with general agent Orr's office in the rear.

General Solicitor Kelly of the Union Pacific announces the reorganization of the legal department of the road, as follows: Mr. John N. Baldwin of Council Bluffs, Ia., is appointed assistant attorney, with headquarters at Omaha, Neb., and Mr. E. Porter Smith has been appointed assistant attorney, with office at Omaha, also. Mr. A. L. Williams will be general attorney for Kansas and will have as assistants N. H. Loomis and R. W. Blair. Mr. Willard Teller and Mr. H. Orahood are appointed general attorneys for Colorado, with headquarters at Denver. Mr. John W. Lacey will be general attorney for Wyoming, with office at Cheyenne, and Mr. Le Young will be general attorney for Utah, with office at Salt Lake City, and will be assisted by Mr. A. W. Agie of Ogden, Utah.

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GENERAL ANÆSTHESIA BY CHLOROFORM OR ETHER, WHICH? LOCAL ANÆSTHESIA BY COCAINE OR EUCAINE, WHICH? GENERAL OR LOCAL ANÆSTHESIA IN ENUCLEATION OR EXTIRPATION OF THE EYE, WHICH?*

BY C. P. GORDON, M. D., OF DALTON, GA.

The first great act of surgical anæsthesia that was done on earth was performed by Jehovah himself in the garden of Eden under the influence of chloroform; and when Crawford W. Long of Jefferson County, Ga., first of all men, in the year 1842, discovered the anæsthetic virtues of ether and performed a surgical operation thereunder, he did a God-like act, and when afterwards Morton and Jackson perfected the method, rendered it systematic and published it to the world, they did a great work for humanity; but when Sir James Y. Simpson of Edinburgh, Scotland, discovered the anæsthetic virtues of chloroform, he accomplished a work second only to that of Jehovah in the garden of Eden when he brought a deep sleep upon our great progenitor and took from his side a rib from which he created woman.

When father Adam in the garden of Eden wandered along the banks of the crystal Euphrates, although enveloped in its sacred shades and fanned by the fragrant zephyrs of that Elysian realm, he was disconsolate and unhappy without a helpmeet and a companion, and hence the great surgical miracle under the influence of chloroform; and I say under the influence of chloroform advisedly, for the sleep was deep, it was quiet, it was tranquil, it was placid, it was beautiful and natural, and not under the horrid nightmare of sulphuric ether, under which the sleep is boisterous, disturbed and shrieking with stertorous breathing, and bronchial râles harsh and horrible, then under ether "sleep no more!" for ether, like Macbeth, hath "murdered sleep."

Now, it is a curious fact in the history of anthropology, that a body so irregular and angular as a rib should have been chosen for the creation of the beautiful and graceful form of woman; there is one muscle in the human body named the gracilis muscle, the graceful muscle. Some anatomist has aptly said that all the muscles of the woman are gracilis muscles. I say, therefore, that it is passing strange that this particular part of the human skeleton should have been selected for such a purpose; it is well known that the rib possesses more sharp edges, rough spaces and faces than any other bone in the skeleton, and besides has a long neck and a small flat head, and is twisted upon itself, and I will say in passing that perhaps this may account for the fact that some of the fairer sex possess so many twistifications; this may be the reason why some of them possess so much perversity, so many "quips and cranks and wanton wiles," and in "our hours of ease are so uncertain coy and hard to please," and varying sometimes as the "shade of the light quivering aspen made," but, thank God, "when pain and anguish wring the brow, a ministering angel thou." I will say further that I believe that this historical rib was taken from a position just over the heart of man, because for six thousand years since she has been nearest and dearest to his heart.

In presenting this paper it is not the purpose of the writer to attempt to discuss exhaustively, or even "in extenso," the relative merits of sulphuric ether or chloroform as agents for the accomplishment of general

* Read before the eleventh annual meeting I. A. R. S., Toronto, July, 1898.

anæsthesia, or to present any lengthy statistics of deaths resulting from ether; but in the discussion by the members of the association and other distinguished surgeons present, to develop the consensus of opinion as to the best method of anæsthesia for operations in surgery. The writer, in an experience of nearly forty years' duration, in both civil and military practice, and in railway surgery, has always used chloroform, and has never witnessed a death from chloroform narcosis; operations have been done in extensive laparotomy cases, requiring its long continued use, with perfect safety; and in railway surgery, attended with hæmorrhage and shock, chloroform has acted equally well; and the writer is firmly of the conviction that when the chloroform anæsthetic is preceded by the hypodermic use of sulphate of morphia and sulphate of atropia and by strong alcoholic stimulation its use is comparatively safe. Cases, however, should be carefully selected in which no condition exists contra-indicating its use; then under chloroform anæsthesia, prevent cerebral anæmia and resulting cardiac depression by sufficient alcoholic stimulation, and secure free admixture of atmospheric air with the chloroform vapor and we have the anæsthetic "par excellence" in surgical operations.

The writer emphasizes the importance of this great question in surgery, and earnestly hopes that this distinguished body will give free and full expression of opinion thereon. It is still a mooted question, and it is a curious fact in the history of anæsthesia that in the United States in the North ether is generally used, while in the South the reverse is the case, and in the days and time of those illustrious American surgeons, Samuel D. Gross and Joseph Pancoast, although professors in the same medical college, the one adhered to ether while the other as strenuously upheld chloroform.

In the use of cocaine, hydrochlorate and eucaine hydrochlorate the writer, although possessing a limited experience with the latter, is favorably impressed with it as a means of producing local anæsthesia for minor operations in surgery; no untoward effect has been caused by it, no cardiac depression or nervous symptoms; the writer has observed in the practice of dentists four cases in which cocaine was used by hypodermic injection in weak solution and in small quantity, severe cardiac depression result, lasting a considerable length of time.

In the operation for enucleation of or extirpation of the globe of the eye, general and not local anæsthesia should be adopted; because in this important operation the pain can be only partially relieved by the local anæsthetic, and to do this even, it is necessary to use the medicine in strong solution and in large quantity, and it not being practicable to isolate the field of operation, dangerous results are liable to happen. It is admitted by those who perform this operation under local anæsthesia that the pain is only partially relieved, and this fact itself is quite sufficient to cause the surgeon to avoid this method, for, in this the sunset glow of the nineteenth century, when the whole surgical sky is red and resplendent with surgical light and knowledge, the surgeon who would unnecessarily subject his patient to physical pain or mental shock is chargeable with inhumanity, to say nothing of surgical barbarity.

I beseech you, then, in this important operation, to permit your patient to enter the glowing realms of ether, or, far better, the balmy atmosphere of chloroform "to sleep, perchance to dream" of beautiful scenes and loved ones, to a wake from a quiet, tranquil slumber with blood stanched and wound dressed, to go on his way rejoicing.

DISCUSSION.

Dr. A. L. Fulton of Kansas City, Mo.: I did not hear all of the paper read, and I did not expect to speak upon this subject. I have my own views upon every subject, and I have them upon chloroform and ether, and those are the two general anæsthetics that are used at this time. I believe the anæsthetic to be chosen should depend upon the condition of the patient, and the surroundings, as well as upon the time the operation would probably require for its performance. Generally speaking, however, I would say use chloroform, but if you have had any unfavorable experience in the administration of chloroform, and you are a coward, do not administer it. Almost anybody can administer ether, but everybody cannot administer chloroform safely. All you have to do with ether is to choke your patient with it, so to speak, and one man can choke

him down just as well as another. With the administration of chloroform it is entirely different; you must approach your patient with care, you must get his confidence, and render him tranquil by some means or other. You should commence the administration of chloroform without frightening the patient to death, and then if you administer it you will make no mistake and will have no death.

I have given chloroform, or have had it given by a competent anæsthetist, and I want to say here that I never allow chloroform to be given a patient of mine, I do not care how careful the anæsthetist is, without watching the patient myself. I cannot help it. I see that the patient is breathing, and that is all you need to take care of. The anæsthetists I have seen will first put their finger on the pulse, then administer chloroform for a little while, then go back to the pulse, and they find the pulse is a little weak, and then a little stronger, and they worry along between giving the anæsthetic and feeling the pulse. We cannot help the pulse anyway; let it alone. If a patient is exhausted from loss of blood, it is not your fault as an anæsthetist. Watch the breathing, and as long as the man or woman, as the case may be, is breathing, you are not in the slightest danger from chloroform. Of course, there is no question in my mind but that in a long, tedious operation, where a patient is supposed to be seriously prostrated, that ether is a better anæsthetic than chloroform. Statistics, however, show a vast difference. If I remember rightly, statistics will show that under ether anæsthesia we have about one death in twenty thousand, while in cases where chloroform is given we have one death to four or five thousand. There is no record of the thousands upon thousands of cases that have been operated upon in which chloroform has been administered. The records we have are those of hospitals alone.

JOHN L. FOXTON, M. D.,
Vice-President I. A. R. S., Huron, S. D

C. F. LESLIE, M. D.,
Vice-President I. A. R. S., Clyde, Kans.

Dr. W. H. Elliott of Savannah, Ga.: Being called upon to say a few words upon this subject, I am glad to have an opportunity to add my testimony to the good words uttered here to-day. I was brought up to give chloroform. After using it for some ten or fifteen years habitually, and only using ether when there was some reason why chloroform should not be given, I changed to ether after commencing with chloroform, because the symptoms were bad. Then I looked up the statistics on the subject, and changed to ether. I gave ether regularly for fifteen years, simply because I was conscientiously led to believe that it was a safer anæsthetic. While I thought it was the vilest thing for the patient, the physician, and everybody else, still if it was my duty to give it, that ended it.

About ten or fifteen years ago I saw an article by Dr. Hunter McGuire of Richmond, Va., on this subject that commended itself more to me than anything I had ever read on it. He satisfied my mind that chloroform was the safer of the two anæsthetics, and since then I have habitually used chloroform, as I did when I first commenced my practice. He

laid down the rule, which I believe all of us agree to, that in diseases of the urinary system ether should never be used. In cases of heart trouble, where there is organic disease, chloroform is the safer of the two. Where there is fatty degeneration, or a weak heart, ether is the safer anæsthetic. I observe the rule that, whatever anæsthetic I am giving, if it disagrees I am ready to stop it at once, and change to ether. A word or two more about it. Since the article of Dr. McGuire was written Dr. Wood, of Philadelphia published a statement to the effect that chloroform was safer in the open air, and in the warm atmosphere of the Southern climate than it is in the North; I am led to believe that to be true. There is one strange thing about it. Hunter McGuire, in his paper, said it is well known that chloroform always agrees with children; it always agrees with women in labor, and it always agreed with the Confederate soldier. (Laughter.) What is it that connects the different classes together? A woman is not afraid of an anæsthetic, nor is a child, and the Confederate soldier was afraid the chloroform would give out before it got to be his turn to be operated on. (Laughter and applause.)

Dr. John L. Eddy of Olean, N. Y.: I wish simply to emphasize one or two points that were brought out by Dr. Gordon regarding the use of chloroform. When he started out and said the first operation under the influence of chloroform was performed by Jehovah, the first question that occurred to me was, How did he know? (Laughter.) Then he went on to give his reasons for knowing the tranquil, peaceful sleep. I do not think there is a doctor present but what has given chloroform at some time or other. We all know that it does not produce a long, tranquil sleep unless you keep applying it. The moment you stop its application your patient assumes consciousness. Now, the reason which the Doctor gives for the performance of that operation under the influence of chloroform is evidence, to my mind, that the operation was not performed under its influence, but was performed under the influence of hypnotism. (Laughter.) As physicians we know that a person, when put under the influence of hypnotism, may sleep calmly and peacefully, breathe easily, hour after hour. Only a short time ago we had an exhibition in our town of a man who was put to sleep in a show window. He was covered up, and at the end of twenty-four hours he was looked after to see that he was breathing, and not molested, and at the end of this time he was restored to consciousness. The greatest reason of all, to my mind, that chloroform was not used upon Adam in extracting a rib to make woman, was that you cannot perform an operation yourself and give chloroform, and there was no third person there. (Laughter.)

Dr. A. I. Bouffleur of Chicago: I did not contemplate making any remarks upon this subject, but we have had the matter up each year for discussion, and it has been received with the usual degree of enthusiasm which seems to be manifested on this occasion, and yet, at the same time, I for one am not as yet thoroughly convinced that chloroform is the only thing on earth with which to put patients to sleep. Having seen a death from chloroform, I have reason to feel diffident in regard to its use. I was an advocate of ether during my earlier years of practice, but during my hospital experience we used chloroform a great deal, as well as ether, and I became attached to chloroform, and in answering questions at that time regarding anæsthetics, I believe I stated that I used chloroform twice where I only used ether once. I considered it then in selected cases equally safe with ether, but a single experience impressed me deeply that chloroform is not a reliable anæsthetic, and all the speech-making in Christendom would not convince me that it is. Perhaps I do not know how to give it properly. In this instance I did not give it, but I watched it administered very carefully, and the patient was not being operated upon at all. The patient took the anæsthetic as peacefully as Adam is recorded to have done to-day, but suddenly died. The post-mortem examination revealed absolutely nothing pathological in that individual's body which could be detected. Of course, some of you might say that we did not select the case. A case which had absolutely no gross pathology would be considered a good one for chloroform. This case occurred in Chicago; one such experience is enough for a lifetime. I do not discard chloroform, by any means; I think I use it about half as frequently now as I do ether. I must frankly admit, however, that I give chlo-

roform with a great deal more fear than I did a few years ago.

The statistics with reference to chloroform and ether are exceedingly interesting, but it must be remembered that most of the statistics have been formulated by physicians in the southern parts of our country, and they have been proven to be absolutely unreliable, because many deaths were not attributed to the anæsthetic, but to shock or hæmorrhage. If you will carefully look over the history of the War of the Rebellion you will find that to be the case, and that is the case with the statistics of Hunter McGuire, which I have had the privilege of looking over carefully in preparing my portion of a text-book on this subject.

Another point is that the administration of chloroform is one you cannot decide as a general proposition. You must study the individual case. Our responsibility ends when we select the case or anæsthetic for the patient. I am satisfied we will lose a patient occasionally by administering either anæsthetic. It would be one of the greatest curses if we had the power of putting people to sleep without danger. If we did not have a death occasionally from the administration of anæsthetics, we could not possibly imagine to what extent they would be used for improper purposes. This is particularly emphasized by the hypnotism craze which is spreading now, and you all know how hypnotism is being used more for illegitimate and immoral purposes than for scientific and legitimate purposes.

Dr. Joseph A. White of Richmond, Va.: I have had a great deal of experience with local anæsthesia in various ways. It happened that just as I received the preliminary programme for this meeting I had a short article in one of our local medical journals in Virginia entitled, "Operations Under Local Anæsthesia."* I am not going to read it, although it would not be long if I did so. I have brought with me a number of reprints of the article, which are at the service of the members of the association. In addition to this article it contains one by Dr. Hunter McGuire, which is of interest also. Ever since cocaine was discovered, as soon as it was possible to get a sample of it, I began to investigate it and experiment with it. I used it in every possible way in which it could be applied for local anæsthesia, and up to this date I have used it in thousands of cases, hypodermatically and otherwise, and I have not seen any alarming symptoms arise from its use. You cannot say that about chloroform, and I have used it hundreds of times also. I have used it for all kinds of operations, but I must say that I have to refer to the statement that it may produce death; I know it can if it is improperly used. All of these anæsthetics should be properly used. In experiments upon patients I take great care not to exceed proper bounds, hence I have never seen any untoward or bad results from the use of cocaine. I do not know whether I was the first or not to remove an eye under the influence of cocaine. I have performed hundreds of enucleations under its influence. I have done this operation with cocaine in children ten years of age, and have done it in men eighty-odd years of age, and with few exceptions they have told me the same lie, that it did not hurt. From what other people say, they have told me lies. I recall an experience I had in the last two weeks. I removed the eye of an old man, eighty-two years of age, who had suffered agony for six weeks with his eyes, so much so that he was kept under the influence of morphia the whole time to prevent pain. I removed the eye under cocaine, and he positively stated that it did not hurt. I do not know whether he was lying or not.

I removed the eye of a gentleman, sixty-five years of age, only last week, who had secondary glaucoma from traumatism, dislocating the lens, and he was suffering a great deal of pain. Anyone who knows what glaucoma is knows how painful it is. Those are the cases where I have given chloroform to remove the eye. Here, again, I used cocaine. Dr. R. S. Martin of Stuart, Va., one of our state medical examiners, and Dr. Warren were present at the operation. I used cocaine in the section of the ciliary nerves and optic nerve behind the eyeball, which seems to be the part naturally most painful. If we cut the recti muscle in squint operations, we hardly ever do it without inflicting more or less pain. I gave the cocaine slowly, although there was a free hæmorrhage. I asked the patient if it hurt, and he said he did not have the slightest discomfort or unpleasant sensation. I cannot produce better evidence than that of the

* Dr. White's article is reproduced in another column.—Ed.

value of cocaine in enucleation of the eyeball. Hundreds of physicians have seen me remove eyeballs under cocaine, and thousands of students have seen the same thing, and have heard patients say that it did not hurt. I once saw a fakir on a street in Richmond, who was pulling teeth, and said it did not hurt. I saw one fellow go up, after he was assured it did not hurt, to have a tooth pulled, and he came down with bleeding gums. I asked him whether it hurt him, and he replied that it hurt like h—. That would not apply to these enucleation cases.

In speaking of local anæsthesia, I want to relate my experience with another method. I do not use cocaine or eucaine in so-called poisonous doses in hypodermic injection. Cocaine has no value on cutaneous surfaces, but only on mucous surfaces. I use what is known as the endodermic, or infiltration, method of local anæsthesia. The preparation I use consists of muriate of cocaine 1 grain, carbolic acid ½ grain, sulphate of morphine ⅛ grain, chloride of sodium 1 grain, and sterilized water 1 ounce. I am satisfied normal salt solution, or even sterilized water, will do the same thing when injected with a sharp-pointed needle just under the cuticle, the skin raising a little blister along the line of the incision, and at the end of two or three minutes you can take a knife and cut through the skin. Tactile sense is not destroyed, but pain sense is. You can take off a finger in this way; you can do almost any kind of operation with it. I have performed operations for frontal sinusitis and tracheotomy with cocaine. After I cut into the deep tissues I drop the cocaine solution 10 or 20 per cent, and it deadens the raw surface. In this strength the bleeding from the parts washes it away just as fast as you apply it. For enucleating the eye I use a 4, 5 or 6 per cent solution. In five minutes you can cut the ciliary and optic nerves without any discomfort whatever.

Dr. William S. Hoy of Wellston, Ohio: I do not care to consume more than two or three minutes' time of the association in discussing anæsthetics. For the last two years in not a single instance have I given chloroform or ether to patients at our hospital to amputate portions of the foot or hand. We control the circulation and use cocaine as an anæsthetic, and we have had splendid results. I have never lost a case by that method of treatment. Three years ago, at the St. Louis meeting, this convention took a vote as to whether they preferred chloroform or ether. I desire now, as a part of my discussion, to make a motion that we take a vote and see how this convention stands in regard to the use of chloroform or ether in selected cases, and which is their choice. Seconded.

Dr. A. I. Bouffleur of Chicago: I wish to enter a protest against this motion, because, from a legal standpoint, this association cannot afford to go on record in that way. I do not think, as a body of surgeons, we should put ourselves on record as being in favor of one or the other. It is true that you and I will use one or the other anæsthetic under certain circumstances in suitable cases. I question the advisability of placing ourselves, as a body, on record in regard to our preference for an anæsthetic. We are all liable to make mistakes and to give the wrong anæsthetic in a certain case. I do not want to commit anybody else as to the choice of an anæsthetic.

Dr. W. R. Hamilton of Pittsburg: I move that the motion of Dr. Hoy be laid upon the table. Seconded and carried amid great applause.

Dr. S. S. Thorn of Toledo, Ohio: I wish to enter my protest against a remark made by Dr. White, with reference to the use of cocaine. I believe he said that if cocaine is properly used it is without danger. I object to such a statement. I also object to the statement that if a patient suffers any unpleasant effects, the cocaine has not been properly used. I do not like to hear any such reflections cast upon men who may be unfortunate in the administration of this anæsthetic. Dr. Chapin of Philadelphia used to stand in his rostrum and say to the members of his class, "There is no excuse and no reason why a physician should lose a case of scarlet fever." His daughter married; she had two children, beautiful girls; one of them had scarlet fever, and died. A few days after, the second child was attacked with the same disease, and it died. The Doctor came down from his rostrum and apologized to the profession, saying that he had done them a great injury. And that is what this loose talking does for us every day. I enter my protest

against the use of chloroform, as I have become convinced from recent laboratory studies that it is the more dangerous of the two anæsthetics. I said before our local medical society that I was not going to use chloroform any more, and I have not used it from that day to this, but I have performed many operations with it. Two gentlemen who were severe in their criticism of my position had lost patients inside of six months. I would not charge them with using a remedy in a manner which was not entirely safe, and I do not want Dr. Hoy to leave all for the attorneys if we fail, and have them say, "You did not use the agent rightly, and therefore you are responsible before the courts."

Dr. John L. Eddy of Olean, N. Y.: One word with reference to the absolute certainty of cocaine, that it is absolutely free from danger. Four years ago in performing a trival operation upon a woman, I came very near sending her across the river. I resorted to the use of cocaine locally, a small quantity of 10 per cent. solution. I had not got to the operation, we were all alone in the office, and I got tremendously scared, I thought the woman was going to die on my hands. My son-in-law, six months previously, had had a similar experience with a case. I think it is unsafe doctrine to preach that any of these strong anæsthetics are absolutely safe under all conditions, because people will die under their influence. Death may not be due in all cases to the anæsthetic, but there may be some other consideration which enters into the cause of death. But from time immemorial people have had different methods of "shuffling off this mortal coil," and little things will come in to help it along.

While I use chloroform freely, I do so carefully, using the Esmarch inhaler and dropper, and applying it drop by drop. I believe a large percentage of the deaths from chloroform are due to the sudden inhalation of large quantities, producing paralysis of the muscles of respiration, and in giving it by the drop method you only give a little at a time. We cannot employ any of these anæsthetics with impunity; we must go slowly. It is said that ether is very harmful in organic diseases of the heart. I was called to see a lady a few years ago who had valvular disease of the heart. She looked as though she would not live three days. It was the first time I saw her, and she wanted to know if she could use ether, and I said to her, "My good woman, we must be careful about using ether in such a case as yours." She said to me, "That is the only way I have got along for the past two years." I asked her how she used it, and she replied that she swallowed it. I asked her how much, and she replied thirty drops every two or three hours. She had, therefore, been taking ether continuously for two years. Each case we have to deal with is a problem by itself, and the man on the ground has got to look it over and decide which anæsthetic to use.

Dr. William S. Hoy of Wellston, Ohio: In response to Dr. Bouffleur, I won't let him off as easy as I thought I would. He makes the statement before this association that we, as a body of surgeons, indorse chloroform in preference to ether, or vice versa. What is the meaning of a proposition of that character? Simply this: If any gentleman in this convention gives chloroform, and he has a fatality as the result of administering it, he does not necessarily give the legal fraternity a foundation upon which to work, but he has simply given the anæsthetic which he deemed was best under the circumstances. Although this association voted my proposition or motion down, I wish to say that it has already placed itself on record in this matter. But I would say that if this association indorses ether in preference to chloroform, if a man is unfortunate enough to have a fatal case, he has a safeguard back of him.

Dr. W. H. Elliott of Savannah, Ga.: I am sorry the motion of Dr. Hoy was laid upon the table, as I think it was misunderstood. If we express our opinion on this subject, it does not necessarily bind us to any more than an opinion. If the majority vote in favor of chloroform, Dr. Bouffleur would be just as much entitled to say that it is safer to give ether than chloroform as before, but it would be a satisfaction to me to know how this association stands. I would like to know how many men think as I do in regard to these anæsthetics.

Dr. F. J. Lutz of St. Louis, Mo.: There is no question, Mr. President, that if we could define exactly the conditions under which one anæsthetic or the other of the general anæsthetics would be indicated, we would be prepared to do better work, but there are cases

in which chloroform only is justifiable. There are other cases in which ether is the preferable anæsthetic. There is a third class of cases in which it is a matter of indifference, ordinarily speaking, and practically, which of the two general anæsthetics is employed. Personally, in my own operative work, except in those cases in which there are positive contraindications, I give chloroform, otherwise ether is administered. On the other hand, I am satisfied, so far as my operative work is concerned, that too much general anæsthesia is employed. I know also from experience that cocaine is far from being a harmless local anæsthetic. I can instance the case of a physician who had an infected wound of the finger, and my assistant who administered cocaine evidently injected it into a vein, for we had an acute case of mania to deal with, which required the combined efforts of ourselves and the assistants to control. It is by no means a harmless procedure. In so far as the injection of cocaine under the skin is concerned, it is perfectly useless. Sterilized water does the same thing, and after we have passed through the sensitive nerves of the skin there is ordinarily no occasion for the employment of any kind of anæsthetic. I say this advisedly. I have removed large goitres under the local anæsthetic method. I have done laparotomies with a simple injection of hot water into the skin. In short, I have done many operations which formerly were considered as extremely dangerous by the simple injection of hot sterile water into the cutaneous structure, not hypodermically, but into the skin itself.

On the other hand, this question is one of the greatest importance from a medico-legal point of view. There are many patients with idiosyncrasies in whom chloroform or ether will not be borne. I will illustrate what I mean by the recital of a case, and at the outset I will say that the anæsthetic was given by the drop method. I had referred to me by a gentleman of our city the case of a woman who had a large tumor situated in the anterior triangle of the neck. She was placed upon the operating table, and as is my custom, we had her take regular inspirations and count them. Beginning at one and continuing, she counted until she reached number ten, the chloroform being given by the drop method. She sat up on the table, fell back, and is dead yet; that was not much chloroform. The heart was carefully examined previous to the administration of the anæsthetic, and a urinalysis had been made. There was no contraindication to the employment of chloroform or any other anæsthetic, and yet there was an idiosyncrasy, which prompted me to follow this case up. A year afterward one of our fellow practitioners did me the honor to call me in consultation in an obstetrical case. Not being an accoucheur, I declined, but he insisted that he was without assistance, and I specified that I would merely act as an assistant. I went with him. It was to be a forceps delivery, and I administered the anæsthetic, having assured the woman, as we often do, that there was no danger, but she very persistently refused to take chloroform. But after a good deal of talk, she finally consented. I gave her chloroform by the drop method, using my consultant's bag. She had taken it for about twenty minutes, when respiration ceased, and I worked on her for at least ten minutes, making artificial respiration, in the meantime delivery going on by the accoucheur. Of course, I was much frightened, and sought for an explanation, which was furnished me the next day by the physician. He said to me, "Doctor, I have made an inquiry concerning that case, and about a year ago you tried to operate on her sister, and she died on the table from chloroform."

This is a coincidence, possibly, or there is a peculiar idiosyncrasy in that family, or it is another illustration of the class of cases in which a patient dies from fright before any kind of anæsthetic has been administered. This question will confront us on the witness stand, to say nothing more of the important fact that it confronts us on the operating table. I dare say we make entirely too much of the witness stand. Mr. Chairman, when you and I are called upon as experts, we will not be asked to state what Dr. Jones, or the International Association of Railway Surgeons knows, but they ask Dr. Ross, Dr. Thorn, or Dr. Bouffleur what his opinion is, based upon his observation and experience. While it is well enough for you and for me to be fortified and be strengthened by what a combination of gentlemen say, after all, the judgment of an organization like this will be a matter of little importance in a court of law.

Then, again, Mr. Chairman, we do not know

just under what circumstances the one anæsthetic should be used, and when it is proper to employ the other. In the German Surgical Society, the proceedings of which I have read with much interest on this subject, they have for years endeavored to collect statistics, and to get the individual expressions of German surgeons as to which anæsthetic is the safer, and they have reached no conclusion. You will recall the distinguished Hyderabad commission which went to Asia at the instigation of an Indian prince; it had its conclusions forcibly attacked so far as the scientific experiments were concerned, and to-day in England there is by no means a consensus of opinion as to which is the safer anæsthetic, ether or chloroform, because there is no consensus of opinon as to the conditions under which one or the other shall be employed.

One word before I conclude, Mr. Chairman, and I have spoken too long now. I desire to repeat the assertion that the use of chemicals, as far as their injection into the skin is concerned, for operative procedures, is not devoid of danger, and that in ordinary incisions it is an absolutely useless addition to the sterile hot water. (Applause.)

Dr. Gordon (closing the discussion): There is one point that has been overlooked. I insisted in my paper that death could be prevented in chloroform anæsthesia by strong alcoholic stimulation. This point has not been touched upon in the discussion. My practice has always been, previous to the administration of chloroform, to use strong alcoholic stimulation of the brain, which I maintain prevents cerebral anæmia and paralysis of the nerves of respiration. I will ask the members of the association to try this in their practice when they use chloroform.

In reference to the use of cocaine as a local anæsthetic, and in answer to Dr. White, I have seen four cases nearly result fatally from a weak solution of cocaine. He says he injects the cocaine into the socket of the eye in 10 per cent solution, and if I understood him rightly, he said he used 20 per cent sometimes, and at others 10 per cent, which he injected into the globe of the eye. It seems to me, cocaine in such strength is dangerous. He also said, in referring to his paper, that the patients experienced no pain. I think a patient ought to know better than Dr. White whether he experienced pain or not.

Dr. Hoy: Do you administer alcohol to every patient before you give the anæsthetic?

Dr. Gordon: Yes, sir; in every case.

Dr. Hoy: How much?

Dr. Gordon: I give it in sufficient quantities to stimulate the brain thoroughly. It requires more alcohol in some cases than in others to do this.

DIAGNOSIS OF BULLET WOUNDS OF THE ABDOMEN.*

By Hugh M. Taylor, M. D.
Professor of Practice of Surgery University College of Medicine; Surgeon Virginia Hospital, Etc., Etc., Richmond, Va.

The surgeon's interest in gunshot wounds of the abdomen is largely focused, 1st, in the diagnosis, and 2d, in the treatment. The diagnosis involves a differentiation between (a) non-penetrating and penetrating wounds of the abdomen; (b) between penetrating wounds with and those without visceral lesion, and (c) between lesions of hollow and solid viscera.

DIAGNOSIS OF PENETRATING FROM NON-PENETRATING.

Are we able with any degree of certainty to differentiate between the penetrating and non-penetrating gunshot wounds of the abdomen? In the absence of the rare evidences, furnished by protrusion of the abdominal vescera or their contents, we can only ascertain positively the existence or non-existence of penetration by a careful dissection along the tubular wound tract through the abdominal wall. This conclusion not only accords with our own limited experience, but is in keeping with the progressive surgical thought of the day.

The Use of the Probe.—With few exceptions, the use of the probe to ascertain the extent of the wound in the abdominal wall is discouraged. Not until the probe has been sterilized, and not until the tubular wound tract has been asepticized, can we, without danger of increasing infection, resort to probing such a wound. The truism of Nussbaum that "the fate of the wounded rests in the hands of the surgeon who applies the first dressing," should, we think, be persistently

*Read before the Medical Society of Virginia, September, 1898.

impressed, as also the equally imperative injunction "never to probe a wound of any character, and especially one of the abdomen, until probe, wound and surgeon have been asepticized," are surgical truths which we cannot reiterate too often.

The finger has been poetically styled a probe with an eye in it. We would urge that the finger needs to be especially well sterilized before it is used to explore a wound. Apart from their potency for evil, the use of the probe or finger as diagnostic means in abdominal wounds is very unreliable. Movements of the skin, muscular planes, and fascias render it difficult to guide the probe or finger along the tubular bullet tract, and the loosely attached peritoneum may be pushed inward by either probe or finger—giving the impression that the peritoneal cavity has been entered. Circumstantial evidence is elicited by examining the character of the wound of entrance and ascertaining a knowledge as to the distance and direction traveled by the bullet. The larger the bullet, obviously, the larger the wound of entrance. The longer the distance and the greater the number of clothes, etc., encountered, the less the penetrating power. Close discharge may be surmised from powder marks around the wound. Equal staining and clean cut, indicates that the bullet entered at right angles to the surface. Unequal staining and irregularity of the edges of the wound of entrance implies oblique entrance and possibly no penetration of the abdominal cavity. This last effect is even more strongly suggested when we have a "long abraded or bruised tract of surface leading up to the penetration." This last conclusion is urged by Greig Smith in his work on "Abdominal Surgery," and he adds in this connection, that "the tortuous wound canal can rarely be followed by a probe without risk of the formation of false passages, and the evidence deduced from probing is always liable to misinterpretation." Dr. Senn, in a recent paper, also takes the same view as to the dangers and uselessness of probing such wounds.

Are there any other means by which we may ascertain the penetration or non-penetration of the abdominal cavity? We cannot agree with Greig Smith, who thinks evidence may be furnished by injecting hygrogen gas into the wound tract, as advised by Senn, the idea being that if the peritoneal cavity is penetrated, the gas will pass on into the cavity and distend it. We repeat that we can only ascertain the extent of the wound by laying open the bullet track to its terminus and there seems to be little if any doubt as to the propriety of such a step in all instances.

DIFFERENTIAL DIAGNOSIS BETWEEN PENETRATING WOUNDS WITH AND WITHOUT VISCERAL LESIONS.

Having ascertained by a careful dissection along the wound track that the peritoneal cavity has been penetrated, we are next called upon to ascertain the presence or absence of visceral lesions. This is a matter of greatest importance and the symptoms to be of value must be manifested early. Can we make the differential diagnosis in any other way than by celiotomy and a thorough examination of the abdominal contents? Are we justified in all instances on finding a perforation of the abdomen and in the absence of symptoms of visceral lesion, in opening up the abdomen to examine its contents? We agree with a majority of surgeons in thinking an exploration is called for in all cases, because of the fact that we know of no symptom or chain of symptoms by which we can discover beyond all question the extent of the intra-peritoneal injury.

Shock.—Does the presence or absence of shock indicate the presence or absence of visceral lesion? A simple contusion of the abdominal wall may be attended by profound shock, while a penetrating wound with multiple visceral lesions may exist with little or no appreciable shock. This is a clinical fact so well known that we need hardly mention it. The presence or absence of shock is in no way significant, but the behavior of shock in many instances is, we think, a guide of signal importance. We cannot illustrate our views upon this point better than by referring to the manifestations in a case recently seen, in which we think it was demonstrated that the time of onset of shock, syncope, or collapse (we use the terms synonymously) is a guide to be depended on.

The wounded man, a station agent, after being shot, walked into his office, telegraphed to Richmond for assistance, and then walked several hundred yards to his boarding house. This history is only interesting in that it shows actions inconsistent with the existence of pro-

found shock. The wound of entrance was in the epigastric region near the median line. A downward direction was inferred, as the pistol was fired from the top of a coal car while the wounded man was standing on the ground. When seen an hour after the injury, in spite of considerable suffering and the fatigue incident to traveling to Richmond there was no appreciable shock. His morale was good, his temperature was normal, his skin dry and his pulse strong, slow and regular. He vomited once soon after being seen, but there was no blood in the vomited matter. About three hours were consumed in getting the patient to a hospital and in preparing patient, operating room, etc., for an aseptic celiotomy. In that time, in spite of the administration of strychnia and morphia, hypodermically, and a saline solution and whisky per rectum, the patient had progressively lapsed into a condition of collapse. Guided by the clinical picture thus presented, we were satisfied prior to an exploratory incision that there was penetration with visceral lesion and intra-abdominal bleeding. It was inferred that hæmorrhage from a wounded intercostal artery or the internal mammary would have been evinced by significant external bleeding. A section of the wound track revealed penetration of the peritoneal cavity, and celiotomy disclosed profuse bleeding to have occurred from perforation through the free border of the stomach near its cardiac extremity, and also a perforation of the left lobe of the liver about an inch and a half from its free margin. Neither wound was bleeding at this time—shock, nature's beneficent hæmostatic, had come to the rescue. Several pints of blood mixed with fluid contents of the stomach were removed from the peritoneal cavity, the stomach wound sutured, the liver wound packed, and the patient made an uneventful recovery.

We recall another case of pistol wound with penetration of the abdomen and perforation of the liver, in which we were able to infer a visceral lesion by the time of onset of shock. This man, a police officer, was shot while trying to make an arrest. Hardly conscious of being shot, he chased his assailant several hundred yards and then walked half a mile to his home. For an hour or more there was little shock. By the time we had moved him to a hospital and were prepared to do an aseptic operation several hours had elapsed and he was collapsed. In both of these cases the wound of entrance was above the umbilicus, and in both we had to recall the fact that there is a much greater likelihood of no visceral lesion from a wound above the umbilicus. In both instances the bullet's course was from above downward, perforating in one case, and lodging in the other near the crest of the ilium. By the absence of primary shock and the appearance in a few hours of profound shock, we were able to diagnose penetration with visceral lesion. Shock from a penetrating wound of the abdomen without visceral lesion, if it occurs at all, will be instantly manifested, reach its acme at once and pass away under appropriate treatment in the usual time. On the other hand, shock followed by reactioin and renewed shock, points to shock of injury from which the patient reacts, and this reaction is followed by shock of hæmorrhage or that incident to extravasation of hollow visceral contents.

During the continuance of the shock of injury, bleeding is held in abeyance; with the passing off of the shock of trauma, reactionary hæmorrhage ensues, and with it we have the shock of hæmorrhage or acute anæmia. Hence in abdominal wounds shock with reaction and succeeding shock points to intra-abdominal bleeding from visceral lesion. Delayed shock, as illustrated in the cases we have reported, point significantly to intra-abdominal bleeding and, of course, to visceral lesion. Delayed syncope or shock points to intra-abdominal bleeding from small vessels; in this instance time is necessary for reactionary hæmorrhage and sufficient bleeding from small vessels to induce renewed shock. A wound of a large vessel like the aorta, iliac, renal or hepatic, would be attended by immediate collapse and death. Of course the shock of hæmorrhage may ensue so rapidly as to be merged into the shock of injury, but we think in a majority of instances valuable information will be afforded, especially as regards wounds of the solid viscera, by the intelligent observation of the symptoms as they are manifested. Shock delayed for ten or twelve hours will usually point to hollow visceral lesion, with escape of contents and the advent of septic peritonitis.

Pain.—Observation and study has led us to

attach but little significance to the presence or absence of pain as distinguishing between the different types of abdominal wounds. By a majority of writers it is held that we may have perforation with multiple lesion and but little pain, while a wound limited to the abdominal walls may be very painful. In this connection I must quote from one who has had an experience with fifty cases, I allude to Dr. W. S. Parker of New Orleans. "Although," he says, "most writers tell us that pain is in no way characteristic of these cases, the most constant symptom that we have observed has been pain referred to the umbilicus." He affirms that he has "never seen a case of penetrating gunshot wound of the abdomen in which this symptom was absent." I recall the fact that Dr. Hunter McGuire, in a paper read before the American Medical Association, twenty-five years ago, spoke of the pain as acute, colicky, resembling a green apple "belly ache." This paper was one of the pioneer papers in which early operative interference was urged.

Vomiting.—A majority of writers fail to find the presence or absence of vomiting blood a guide. Not infrequently when there is a wound of the stomach no blood is found in the vomited or syphoned contents of the stomach. In the case we have reported, although there was a perforation of the stomach and free hæmorrhage into the peritoneal cavity, there was no blood in the stomach contents vomited in our presence. Stomach and intestinal contents pouring out into the peritoneal cavity is much more likely to carry the blood also into the peritoneal cavity. Protrusion of the mucosa into the wound also helps to block the entrance of blood into the lumen of the wounded viscus. In this connection, we may mention that Greig Smith says, "One of the most important symptoms is a feeling of nausea, frequently accompanied with vomiting." We cannot agree with Mr. Smith when he says "This is not common in false shock." We think both nausea and vomiting are equally common in traumatic and physical shock. Certainly vomiting, per se, is no guide, and even the presence of blood in the vomited contents is not conclusive of penetration of the stomach, since not infrequently a simple contusion of the stomach wall may result in hæmorrhage into the cavity of the stomach.

Blood in Fæces.—We cannot wait for blood in the fæces, even if its presence was noted we would not know that it did not come from a contusion of the intestinal tract and not necessarily from a perforation.

Emphysema of Wound Tract.—Air escaping from or diffused in the cellular tissue surrounding the wounded tract is no longer considered a guide, as it may have found its way in through the wound of entrance or be gas from putrefactive changes.

The escape of viscera or their contents through the wound is an exceptional occurrence, notably so in the case of wounds from small jacketed bullets from high power guns.

Blood in the Urine.—While strongly suggestive, is not confirmative of a perforation of the genito-urinary tract. A perforation of the peritoneal wall of the bladder may be ascertained by drawing off the urine and then injecting a measured quantity of aseptic fluid into the empty bladder. If the bladder readily distends, and if in a short time as much of the fluid is withdrawn as was put into the bladder, the inference is strong that there is no perforation of the bladder. This evidence, of course, does not preclude a possible lesion of the ureter or pelvis of the kidney.

Gastro-Intestinal Trace.—The most important intra-abdominal wounds to diagnose early are those involving the gastro-intestinal tract. We have seen that shock, pain, vomiting, etc., do not furnish evidence at all conclusive. It is held that we may, with almost certainty, expect multiple bowel perforation if the abdominal cavity is penetrated below the umbilicus, while the outlook is better if the wound of entrance is above the umbilicus. We think such wounds without visceral lesion must be so rare, it it a pity it ever occurs, as it inclines not a few to wait for urgent symptoms before resorting to operative interference.

Before considering the diagnostic means of perhaps the greatest importance, let us look at the probable evidence afforded by escape of intestinal gas into the peritoneal cavity and inducing hepatic resonance in place of normal liver dullness. Theoretically an escape of gas from the intestines into the peritoneal cavity, and the insinuation of this gas between the lower ribs and convex surface of the liver, should furnish reliable information, but it de-

pends upon a sufficient escape of gas, an absence of adhesions between the liver and parietal peritoneum of the chest wall and diagnostic acumen sufficient to detect the gas. A majority of writers allude to this diagnostic means, but as far as we have been able to ascertain but few rely upon it. To be of service it must be manifested early, as intestinal paresis from sepsis will very quickly cause distension of the intestines and efface liver dullness.

Senn's Hydrogen Gas Test.—Many years ago Dr. Senn brought to the attention of the profession this means of diagnosing perforation of the gastro-intestinal tract and its technique is well known. We do not think this diagnostic means has been as well accepted by the profession as it merits. A majority of writers do not write encouragingly about it. Dr. Senn, however, has never lost confidence in it as a means of diagnosing an intestinal perforation. He has, upon every occasion, urged its use. He thinks by this means we may avoid an exploratory incision, and evisceration for diagnostic purposes. The objection to the use of hydrogen gas or filtered air does not appear to me to be logical. It has been claimed that the gas is rarely available when needed, that the paraphernalia, i. e., the rubber bag from which and by which we are to drive the gas or air into the intestines under pressure and under an anæsthetic is not often conveniently at hand. This is not a fault of the method. If we can accomplish by means of rectal insufflation what Dr. Senn has accomplished, it is the duty of the surgeon to provide the needed apparatus. In sixteen cases of gunshot wounds of the abdomen, Dr. Senn was able to find no lesion in two, and, of course, no need for an exploratory incision. The objection to this practice so often urged, that distention of the bowels makes it more difficult to return them if a section is made, is not sufficient.

By rectal insufflation only can we ascertain without an exploratory incision that there is no bowel perforation. Exploratory incision and rectal insufflation are our only guides available soon enough to enable us to do preventive work. The task of returning distended bowels is by no means a serious undertaking, and if it can show no intestinal wound, no section, and evisceration will, in the experience of Dr. Senn and Greig Smith, be necessary. For that matter, an opening in the bowel could be made to let the gas out. The surgeon does not fear the intestinal lesion, his fear is that he will not find them all. The mortality is due to not getting at the lesions early and in overlooking one, or more. It has been held that leakage of intestinal contents into the peritoneal cavity is ensured by distending the bowels. I do not believe that a wound of the small bowel will ever occur without leakage of its ever fluid contents. I think it a pity that the idea should ever be held that leakage may not occur, as it encourages a supposed conservatism almost inevitably fatal.

The mission of insufflating the intestines with gas or air is to ascertain prior to an exploratory incision the existence of an intestinal lesion. If it will accomplish this, we are not excusable for not using it because of the trouble, etc., incident to its use. Its second mission is to ascertain the location of the lesion after the abdomen has been opened and by this means avoid evisceration and handling. The second mission, it seems to me, to be of minor importance as compared to the first.

SOLID VISCERAL WOUNDS.

Can we differentiate between wounds involving the solid viscera from wounds limited to hollow viscera? We do not think this possible with any degree of accuracy, nor do we deem it essential, as in a majority of instances in both classes of wounds operative interference is indicated. We should recall that multiple wounds are the rule and that both solid and hollow visceral wounds commonly co-exist. The symptoms and dangers incident to solid visceral wounds are due to hæmorrage. Recalling the fact that the symptoms of hæmorrhage (usually parenchymatous) are not manifested immediately and are progressive, we can sometimes quite accurately diagnose intra-abdominal bleeding, but there may also exist multiple hollow visceral perforations, without significant symptoms of such lesion until the advent of septic peritonitis. Unless we can eliminate gastro-intestinal or vesical perforation by distending those organs we cannot eliminate perforation except by a celiotomy.

Blood in the Abdominal Cavity.—Dullness on percussion in the right and left colic regions—varying areas of dullness with

changed position of the patient and fullness in the cul de sac may afford evidence of abdominal bleeding. But in estimating such evidence we must eliminate distension of colon, etc., from fæcal matter and we should further regard the fact that extensive bleeding must have occurred before its presence can be appreciated. Ideal surgery contemplates operative interference to prevent the disastrous consequences of profuse bleeding and acute anæmia.

Briefly we would urge: 1. That an X-Ray examination locating the bullet in the abdominal wall is the only contingent which warrants us in not laying open the tubular bullet tract down to the peritoneum to ascertain if the cavity has been penetrated. 2. That we are justified, if ever, in non-operative interference only in the event of Senn's hydrogen gas affording evidence that there is no hollow visceral lesion, and the absence of symptoms of hæmorrhage leads us to suppose there is no solid visceral lesion. 3. That until our means of differential diagnosis is very markedly advanced, the safe and conservative course in all penetrating wounds of the abdomen is to open the abdomen early and do thorough and quick intra-abdominal work.

Responsibility in Administering an Anæsthetic.

A discussion has been carried on in a provincial lay contemporary upon the question, Who is responsible in practice for the conduct of the administration of an anæsthetic? Several deaths occurred at a provincial hospital, and upon these the local press, it appears, commented. The question of such responsibility is, however, one which has a much wider interest and importance. Usually the patient admitted into the hospital is received by a resident house surgeon or medical officer, who examines his condition and reports to his superior, the visiting surgeon. When an operation becomes imperative the latter decides upon it, and an administrator of the anæsthetic comes upon the scene. He may be a house surgeon, senior student, or a special officer, a member of the staff specially appointed to give all anæsthetics. Who now decides upon what anæsthetic is to be given, what method employed, and in extreme cases whether or not any anæsthetic shall be given? A hospital surgeon of long standing and wide experience, in commenting upon the subject, contends that these questions lie solely within the province of the surgeon in charge of the case, upon the ground that he, and he only, has the opportunity of studying the case, and so is the best qualified to sit in judgment upon the points at issue. Upon the other hand, a gentleman in general practice writes that, at least as regards private practice, he considers the surgeon as the least competent, since the family doctor, he alleges, knows all about the patient, while the surgeon views him wholly from the standpoint of his surgical malady. Probably much may be said on either side. Certainly, in cases when special anæsthetists are called in, the problem is more complex than when the surgeon calls upon a house surgeon to give chlorofrm and also occasionally to assist him at the same time. If competent medical men who devote themselves to the study of what is admittedly a large subject, and one not free from special difficulties and requiring some special training, are found willing to practice solely in the capacity of anæsthetist—and that such is the case is shown in the past by the valuable work of such men as Snow and Clover—it becomes a grave question whether or not they should be regarded as mere experts in the methods of giving an anæsthetic and accepting no responsibility beyond that involved in the technique of their calling, or whether, on the other hand, they have a right to determine what anæsthetic is best in any given case under any given condition. It is urged on behalf of the anæsthetists, with some show of reason, that when an expert is called upon to give the anæsthetic, with him should rest the onus of selecting an appropriate anæsthetic and the responsibility of giving it in such a manner as to impede as little as possible the manipulation of the surgeon and afford the patient the greatest chance of getting safely through the operation. In all cases of special doubt or difficulty a consultation between the administrator and the operation should enable the former to examine the patient and ascertain the surgeon's views and wishes.—London Lancet.

In the absence of organic disease, the ability of a patient to stand severe surgical operations depends greatly upon the state of his blood vessels. Hardened arteries in middle age place the patient, for surgical purposes, in the class of old men. "A man is as old as his arteries."—Int. J. Surg.

Statistics appear to show that chloroform is less dangerous in warm than in cold countries. It is therefore always advisable, whenever for any reason chloroform is to be preferred to other anæsthetics, to see that the operating room has a high temperature.—Int. J. Surg.

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A NEW THEORY OF THE CIRCULATION.

Dr. M. J. Rodermund of Appleton, Wis., has propounded a new and somewhat startling theory of the circulation. If the doctor is correct the fancied security of the doctrines taught by Harvey and Servetus and Cæsalpinus will be rudely dispelled and our physiologies and pathologies will have to be recast.

According to his thesis the heart has no more to do with propelling the blood through the arteries than the stomach or liver.

"I am convinced," he writes, "that the power which propels the blood is received through the lungs and not performed by the heart. My first forcible thought that the heart does not propel the blood was in observing the pulse of sick people. We find in the sick that the weaker the patient and the weaker the action of the heart the faster the circulation. Again, we have a quick circulation of the blood where the pulse is as full and strong as in the healthy subject. Take, for instance, the circulation in children. The younger or more delicate the child the faster the circulation. Tracing these well-known facts to fœtal life, it is still faster, but at the birth of an infant we can notice several changes that are strong and incontestible evidence in demonstrating the power that propels the blood. Another proof of the power that propels the blood is furnished by holding the breath. The longer you hold the breath the slower and feebler the pulsation becomes in every single person, well or sick. Try it on yourself, but not too long, and note the slowing of the pulse, and see how full and bounding the circulation becomes after taking a few inspirations of pure air. In many instances the rate of the pulse will increase from seven to twelve beats, besides being much stronger. * * * Another strong argument that the heart cannot propel the blood is that size (all other things being equal) is a measure of power. It is estimated that the heart in order to accomplish the task of propelling the blood to all parts of the body exerts a power at every pulsation equal to fifty pounds, varying in different persons according to health, labor, etc. This would be equal to 200,000 pounds every hour awake and asleep—and this would mean that the heart puts forth energy sufficient to raise its own weight 20,000 feet every hour—where an active pedestrian climbing a mountain can raise himself only about one-twentieth of that distance. These estimates refute themselves. That it is some tremendous force that does send the blood through the arteries is easily seen by its spurting for yards when an artery is cut; but that the heart and blood vessels could withstand all this dynamic pressure from birth until death is impossible. What machinery could withstand all this terrible strain? Had we not better look about us and see if nature has not provided some other means more rational, less liable to derangement, not contradicted by every law of dynamics? This tremendous power necessary to the circulation of the blood is the same as that which furnishes the motive power throughout universal nature. It is furnished through the lungs by the air we breathe. Instead of the blood carrying oxygen through the system, it is the oxygen from the air that sends the blood bounding through all the minute capillary blood vessels, exactly reversing the old theory that has been believed by us all for nearly three centuries. In other words, it is the oxygen we breathe, based on the fundamental laws of electricity, that all positive electric bodies proportionately repel, while all negatives and positives attract each other," * * * and so on.

The doctor's article was shown to several Chicago physicians, who were all very skepti-

cal of the truth of the theory. One gentleman said:

"Let him take the heart away from one of his patients and maintain circulation by means of the lungs, and then I will believe it." The doctor promises to do this and we shall await the outcome with pleasurable anticipations.

In the meantime Porter's experiments at the Fourth International Congress of Physiologists, which has lately closed at Cambridge, England, would seem to be the best answer to the new theory, in addition to the fœtal circulation. This observer, who is the associate professor of physiology in the Harvard Medical School, showed by actual experiments: First, that the heart of a mammal, if kept distended with blood, will beat for some time after excision, like the frog's heart. Furthermore, he showed that every part of the excised mammalian heart will keep on contracting regularly if suitably fed with blood through a branch of the coronary artery.

Extracts and Abstracts.

Operations Under Local Anæsthesia; Experiences at the Richmond, Va., Eye, Ear and Throat Infirmary.

By Joseph A. White, A. M., M.D.

The risk attending the administration of general anæsthetics for surgical operations, while not very great, has always been sufficiently in evidence to make every surgeon not only exceedingly cautious, but even more or less anxious when obliged to resort to their use. Hence, the oftener the even occasional necessity of general anæsthetics can be dispensed with, the better for both patient and operator. Any recourse that may enable us to do this should, therefore, be gladly welcomed, and especially is this true of operations requiring much time for their performance. In addition to the greater safety to the patient and the respite from anxiety to the surgeon, there is the added advantage of having the intelligent assistance, and frequently guidance as well, of the individual operated upon.

It is nothing new to all medical men that many eye, nose and throat operations have been performed for some years past under local anæsthesia induced by cocaine, the method being the simple application of an aqueous solution of the muriate of cocaine to the part to be operated on, the strength of the solution depending somewhat upon the seat and nature of the operation. Most medical men understand also that this method applies only to mucous surfaces anywhere in the body, and not to cutaneous surfaces, the latter not being influenced in any way by such a method. Still, cocaine and its various substitutes more recently discovered, such as eucaine, holocain, etc., proved a great boon, by doing away with general anæsthesia in the various surgical operations in which they were applicable. Not only were such operations as cataract extraction, iridectomies, tenotomies of the muscles, etc., rendered painless, but were made easier of performance, because the patient could direct the movements of the eye, according to the necessities of the operation, which was impossible under general anæsthesia. This assistance is especially of value in operations for crossed eyes, in order to regulate the extent of the tenotomy, as under general anæsthesia the eyes wobble all about, and the surgeon cannot judge of his work. I have performed tenotomies, with local anæsthesia only, in children between five and seven years of age, who were as tractable as adults as soon as they found that there was no pain during the operation. Even for the removal of the eyeball, the most formidable of eye operations, I have for years past, except in little children, used local anæsthesia only, with entire satisfaction to the patient. The first steps of this operation, the cutting loose the conjunctiva and the tendons of the recti muscles, can be painlessly accomplished with the use of a four per cent. solution of cocaine, while a stronger solution (ten per cent. to twenty per cent.) is required to deaden the deep tissues surrounding the optic and ciliary nerves before their division, a few drops being injected by means of a syringe with a long canula, which is passed behind the globe about five minutes before the section is made. Exceptionally, we meet with painful and irritable eye balls that require the stronger solution from the beginning of the operation, and although I have used it freely in such cases, I have never seen any bad results. Cocaine is poisonous when used to excess, but persons differ as to their susceptibility to its influence, and what may produce unpleasantness in one will not do it in another; ordinary care will guard against any untoward effects.

I know many ophthalmic surgeons who still adhere to general anæsthesia in this operation, but see no reason to take this risk, and am confident if they give local anæsthesia a fair trial, they will never return to their former method.

In some cases of acute glaucoma, and in hypopyon keratitis, I find that local anæsthe-

sia occasionally fails, and I am obliged to resort to chloroform or ether.

The value of cocaine or its substitutes in nasal surgery is inestimable. Anyone who attempts intra-nasal operations knows how difficult they are to do under general anæsthesia, as it is almost impossible to keep the head in proper position for illuminating the interior of the nose, whilst with local anæsthesia in addition to being painless, every step of an operation can be seen, whether in the anterior or posterior nares. This applies equally to the removal of adenoid tissue, for which so many surgeons use general anæsthesia. I never think of doing this in persons over six or seven years, unless in the case of exceedingly nervous or timid children. With the palate retractor in position, and the parts thus thoroughly exposed to view in a mirror, the operation can be more satisfactorily performed than with general anæsthesia and with as little pain. I have removed large post-nasal tumors (fibroids and others) in this way with comparatively little pain, operations that formerly were regarded as formidable because of the necessity of opening the face to get at them. I have recently had a case of this kind in a lady who was examined by several specialists, who decided her only chance for the removal of such a growth, and thereby save her life, was by the elevation of both superior maxillaries, but that her general health was so much impaired by the effects of the growth, the result of such a radical operation would be probably fatal. I reluctantly consented to operate per vias naturales under cocaine anæsthesia with a most gratifying result, and she is now on the high road to a perfect recovery.

The local application of cocaine has also been of incalculable benefit in enabling us to curette and cauterize ulcerated surfaces within the confines of the larynx, and to remove growths and foreign bodies therefrom, proceedings which, prior to the discovery of cocaine, were attended with the greatest difficulty on account of the reflex spasm which the operative interference induced. A twenty to thirty per cent is, however, required to produce anæsthesia of the larynx.

Cocaine used hypodermically has also been of great value in operations on the skin. I have performed numerous plastic operations on the eyelids and face without pain by means of this method of inducing local anæsthesia. As cocaine, however, is poisonous, and apt to produce alarming symptoms, especially when applied hypodermically, I have always been extremely cautious in using it in this way, and for some time past I have entirely discarded this method, having substituted for it a better and safer one. This is the intra or endo-dermic or infiltration method of inducing local anæsthesia when doing operations involving the cutaneous surface. I have forgotten to whom I am indebted for having my attention called to this method, but I think it was Dr. Würdeman of Milwaukee who first demonstrated its efficacy to my satisfaction.

The solution I use is—

Cocaine muriat	gr. i.
Carbolic acid	gr. ½.
Morphiæ sulph	gr. ⅛.
Chloride of sodium	gr. i.
Sterilized water	℥i.

M.

I am satisfied the normal salt solution or even ordinary sterile water will answer the same purpose, but I am in the habit of using this recipe, and its effects are all that could be desired. With a very fine and sharp hypodermic needle, little punctures are made just below the epidermis, and into but not through the dermis, and a drop of this solution injected, making a row of little blisters, as it were, along the line of the incision to be made through the cuticle, whether short or long, whether straight, angular or curved. In a few moments, a sharp knife can be passed through the skin without the slightest sensation of pain, although the tactile perception is not abolished. As soon as the subcutaneous tissues are reached, I begin cocaine anæsthesia by simply dropping a solution of this drug on the exposed deep tissues just as I anæsthetize any mucous surface. As very much of the solution is carried off by by bleeding or oozing from the raw surfaces, there is rarely sufficient absorption to produce any constitutional symptoms. Some idea of the usefulness of this combination method of inducing local anæsthesia may be gleaned from the kinds of surgical operations I have performed with no other help and with absolutely none or a minimum of pain. For example, I have recently done a tracheotomy under exceptionally difficult circumstances in a case of stenosis of the larynx, attended with such swelling of the neck that the trachea lay not less than three inches from the surface, and all ordinary anatomical guides in performing this operation were absent. Because of these facts and the free bleeding from engorgement of all the blood vessels, the operation had to be done very slowly, and occupied more than two hours. Notwithstanding, the patient said there was absolutely no pain of any consequence from the first incision to the insertion of the tube. Another operation, done under the same method of anæsthesia, was opening the frontal sinus. The incision, an inch and a half to two inches long under the brow to the bridge of the nose, and passing up on the forehead between the eye-brows down to the bone, was absolutely

painless. The periosteum was elevated, the anterior wall of the sinus chiseled away, the partition wall in the sinus broken down, the cavity thoroughly curetted and a large opening made through its floor into the nose with little, if any, pain, the time occupied being at least an hour and a half. I have also done several plastic operations on the eyelids, necessitating the dissection and shifting of skin flaps, with equal satisfaction to myself and the patient.

My experience has been so gratifying in the use of this method of inducing local anæsthesia, that I can safely recommend it to those who are not familiar with it, confident that if properly done it will prove as satisfactory to them as it has been to me.—Bi-Monthly Bull. Univ. Col. of Med.

Fractures of the Skull.

By J. Garland Sherrill, A. M., M. D.

Fractures of the skull are divided into those of the vault and those of the base. Frequently a fracture extends from the vault to the base, and such an injury proves additionally serious from its extent.

The mere fissure or solution of continuity of the bones of the calvaria does not of itself prove serious; but the damage done to the brain substance and to the intracranial vessels by the force which produces the fracture, and the injury of these structures by fragments of bone, determine the gravity of a given case. In fact, in a case recently reported to me by the attending surgeon, the patient died from rupture of the middle meningeal artery as the result of a blow, without the presence of any break in the bone.

A fracture complicated, then, by injury of the contents of the calvaria, is a very serious affair, and the additional complication by a communication with the surface and the probability of septic meningitis adds much to the gravity. A fracture might be possible without either of these more serious complications, but it is of such rarity that it is safe to say that a fracture of the skull is always complicated.

Fractures involving the base differ from those of the vault in that the force necessary to their production is greater, and also in the proximity of the most vital structures. The prognosis in these injuries is therefore even more grave than in those of the vault.

No injury about the head is so insignificant as to be ignored, and none so severe that there is not a chance for the patient's life. I have personally seen extensive fractures and even those from gunshot wounds which were not fatal; again, I have known patients to succumb to an apparently very trifling injury in this region.

Symptoms.—Symptoms indicative of a fracture of the skull are very frequently delayed for some time after the occurrence of the injury. I recall two cases terminating fatally in which symptoms of serious injury of the brain were not present for over twelve hours. In each of these cases the fracture extended from the vault to the base, and in one almost entirely across the base of the skull.

The symptoms following injury to the skull have been classified as those of concussion and those of compression of the brain, and the lines of distinction have, by most writers, been very clearly drawn. I believe that in the majority of these injuries we will find symptoms present which are the result of laceration of the brain, and also in certain cases symptoms indicative of pressure upon the brain itself, either from bone or from hæmorrhage. Some time must of necessity elapse before the compression from hæmorrhage occurs, but when a fragment of bone presses upon an important center, the symptoms come on at once; and in marked cases these symptoms are unmistakable—complete unconsciousness, slow stertorous respiration, full slow pulse, skin usually warm and perhaps moist, pupils respond feebly or not at all to light, temperature slightly subnormal; the condition of the pupils varies according to the site of pressure, often both contracted, or one may be dilated and the other contracted; power of motion is lost, retained urine overflows, and fecal incontinence prevails. Cases with marked symptoms are urgent, and the diagnosis is certain.

The delay necessary for the development of these symptoms resulting from hæmorrhage lessens the chances of benefit from operative measures owing to the frequency with which the brain fails to expand after exposure to this amount of compression. Therefore it is imperative that the earliest symptoms of brain injuries be studied. Laceration of the cerebral tissue, no matter how slight, produces the symptoms of syncope and shock, and these symptoms increase proportionately with the amount of damage done, from a slight dizziness to more or less complete loss of consciousness, with pallor of the face, cold, damp surface, nausea, and perhaps vomiting. This later symptom, formerly looked upon as favorable—indicative of returning consciousness—while probably true sometimes, has more frequently no significance with reference to the amount of damage present. The pulse in these cases may be rapid or slow, but is usually feeble and compressible. According to Gross, hæmorrhage from nose is not infrequent, and even bleeding from the ears may occur without fracture. This latter symptom only means that the blow was severe enough

to rupture the drum membranes, and this of course would be more likely to occur when the petrous portion was broken. The respirations are usually shallow, intermittent, sighing, but may be noisy or labored. Temperature is markedly lowered.

These symptoms are very variable and often merge into those first described. The symptoms are by no means constant or indicative of the character of the injury present, and are for the most part probably produced by the effect of the injury upon the sympathetic system.

With such a train of symptoms presenting, what is best to be done for the patient? No steps should be taken without the geatest care and painstaking to observe aseptic rules. It is perhaps better to allow the patient to go unaided than to add a septic infection to his already grave condition. Before arriving at any conclusion the scalp should be shaved and carefully examined; valuable information can thus be elicited. Whenever there is the slightest suspicion of a fracture, an exploratory incision through the scalp should be made. The value of information thus elicited by far outweighs the danger of such incision, which, with proper precaution, is trifling. Whenever a fracture is discovered the calvaria should be opened and its contents examined. The danger of epilepsy and other nervous disorders is so great, to say nothing of the immediate danger to life, from failure to lift a fragment of bone or to remove a clot, that a surgeon is to be censured who fails to follow this plan of investigation and treatment.

The patient presented fully exemplifies the value of this advice, as is shown by the following history:

Mr. R. B., white, laborer, aged thirty-two years, was struck a severe blow on the right side of the head above the ear about 3:30 p. m., April 6, 1898. The patient was given a hypodermic injection of digitalin by his physician before admission into the hospital. About three-quarters of an hour later, upon admission into the ward, he was partially conscious, replying indifferently well to questions; never unconscious. Pulse was compressible, but only 40 to the minute; respiration 14 and shallow; no stertor whatever; surface pale and cold, with slight perspiration; no evidence of paralysis. When I first saw the patient pupils were both contracted; later the right was dilated and the left contracted; both responded feebly to light. There was slight hæmorrhage from both ears, most from the right.

After shaving the scalp, a contusion of the tissues above the right ear and a hæmatoma could be detected. On deep pressure the patient flinched. No fracture could be made out. The scalp was lifted to clear up the diagnosis, and the following condition presented: A depressed fracture two inches in width by three and one-quarter inches in length was found involving the lower part of the right parietal and upper part of the squamous portion of the temporal bone. On removing this a large extra-dural clot was discovered, evidently due to rupture of the posterior branch of the middle meningeal artery.

At six o'clock in the evening, about two hours after the operation (April 6), the patient's pulse was 74, respiration 24, temperature 97.4 degrees F.; at seven o'clock the temperature was 98.6 degrees F., reaching 100.2 degrees F. later in the evening.

At six o'clock p. m., April 7, temperature was 99.8 degrees F., respiration 22, pulse 60. Little change until April 10, when temperature was 101.6 degrees F., respiration 32, pulse 78.

April 11, 2:30 p. m., temperature was 101.4 degrees F., respiration 54, pulse 106, reaching 120 shortly afterward.

On each of these occasions the wound was dressed, and immediately after the dressing the respirations came down. Up to that time there had been no suppuration, but there was a large blood-clot between the scalp and the dura which caused some pressure, and the absorption of serum probably gave rise to the elevation of temperature and acceleration of pulse. Two days later slight infection occurred; the wound was partially opened and thoroughly irrigated, and after this washing (April 13) the man had no trouble whatever. There has been some little discharge from the wound since, but the brain seems to be free from infection.

While the patient was present, you observed that the wound had almost entirely healed. The man's intellection is perfect; there has not been at any time the slightest evidence of paralysis; and if we can judge from his present appearance, ultimate recovery is assured. I made a very large horseshoe incision, extending from a point just behind the ear to within one inch of outer angle of the orbit.

The mortality following trephining (according to Wagner and Seydel) is so slight (1.23 per cent) compared with the cases expectantly treated (33.33 per cent), that in my opinion operative interference is positively demanded in all cases of fracture of the skull within reach of the investigation of the surgeon.—Med. Age.

The amount of absorbent dressing over a wound should be gauged by the probable amount of effusion of blood and serum likely to occur. It is better to err on the side of extra-copiousness. A scanty dressing necessitates frequent change, since saturation of the covering defeats purposes of asepsis.—Int. J. Surg.

Notes of Societies.

Program Annual Meeting Erie Railroad Surgeons' Association, October 19, 20, 21, '98. Grand Pacific Hotel, Chicago, Ill.

Wednesday, October 19. 9:00 a. m. Reception of members and guests.

10:00 a. m. Address of welcome by G. A. Coe, superintendent Chicago division C. & E. Railway.

Response by the president.

"Injuries of the Scalp," W. E. Lower, M. D., Cleveland, O. Discussion, opened by C. M. Daniels, M. D., Buffalo, N. Y.

"Scar Tetanus," C. B. Kibler, M. D., Corry, Pa. Discussion, opened by Webb J. Kelly, M. D., Galion, O.

"Contusions and Contused Wounds," H. C. Mooney, M. D., Laketon, Ind. Discussion, opened by N. S. Everhard, M. D., Wadsworth, O.

2:30 p. m. Clinic, at the Northwestern Medical College, Prof. John E. Owens.

7:30 p. m. Prof. H. P. Pratt, M. D., will read a paper on "The Value of the X-Ray, from a Diagnostic and Theraputic Standpoint."

Thursday, October 20. 9:30 a. m. Paper, "What Shall We do to be Saved, from Foul Air in Sleepers?" J. A. Richey, M. D., Oil City, Pa. Discussion, opened by E. E. Holman, M. D., Chicago, Ill.

Subject, "Surgical Experience in the Recent Campaigns in Cuba and Porto Rico," Prof. G. W. Crile, M. D., Cleveland, O.

Paper, "Transfusion of Normal Physiological Saline Solution," Prof. J. P. Webster, M. D., Chicago, Ill. Discussion, opened by C. S. Parkhill, M. D., Hornellsville, N. Y.

Paper, "Traumatic Thrombosis," R. C. Kinnaman, M. D., Ashland, O. Discussion, opened by W. M. Bemus, M. D., Jamestown, N. Y.

Election of officers, unfinished business, new business, selection of next place of meeting.

2:00 p. m., Tally-ho ride.

Friday, October 21. 10:00 a. m. Clinic at Cook County Hospital, Prof. J. B. Murphy.

Adjournment.

A Civic-Philanthropic Conference.

A civic-philanthropic conference is to be held at Battle Creek, Mich., October 18 to 23, 1898. At this conference social, hygienic, philanthropic, and patriotic questions will be presented by prominent workers of all denominations, with a view of evolving some practical methods of hygienic, sanitary, and civic reform.

Thursday, October 20, will be Health and Sanitation Day, with William E. Quine, M. D., Dean of College Physicians and Surgeons, Chicago, presiding. This day will be devoted to the consideration of sanitary and hygienic condition of public schools necessary to the health of the pupils; medical inspection of public schools; how to improve the unsanitary and unhygienic condition of the tenement districts of cities; the public water supply; how hygienic cookery and diet may be best taught to the masses; influence of environment; home treatment for the injured; how to care for contagious diseases in the home. A body of fifty representative physicians from Chicago are expected to be present and participate in this day's sessions.

Friday, October 21, will be Mayors' Day, with Hon. Samuel M. Jones, mayor of Toledo, O., presiding. This day will be the occasion of a meeting of county and city officials from municipalities in Michigan and surrounding states, to consider very vital questions: Methods of municipal organization; the betterment of municipal politics; how to relieve the unemployed and eliminate pauperism; what to do with the ex-convict; how to improve the civic condition of the wage-earner.

The remainder of the conference will be devoted to the consideration of philanthropic questions, such as, Social or University Settlements; Medical Missions for the Poor; District Nursing; Mission Farm Colonies; Emergency Relief; The School of Philanthropy; Home-Finding for the Homeless.

All persons interested in lessening the burdens and increasing the happiness of oppressed humanity are cordially invited to be present and co-operate in making this meeting count for good. There will be opportunity for the free discussion of the various questions before the conference.

S. SHERIN, Secretary,
Sanitarium, Battle Creek, Mich.
DAVID J. BURRELL, D. D., President.
New York, N. Y.
J. H. KELLOGG, M. D., Vice-President,
Sanitarium, Battle Creek, Mich.

Western Surgical and Gynæcological Association

The eighth annual meeting of the Western Surgical and Gynæcological Association will be held at Omaha December 28 and 29, 1898. Titles of papers from some of the leading surgeons of the West are already in the hands of the secretary and the coming meeting promises to be the most interesting yet held. The local committee of arrangements at Omaha is actively preparing for the entertainment and comfort of those who attend. Surgeons and gynæcologists, and those interested in the progress of these specialties, are cordially invited to affiliate themselves with us. The secretary will be glad to send application blanks.

Titles of papers should be sent to the secretary as soon as possible, but not later than November 20, to insure a place on the programme.

GEO. H. SIMMONS, Secretary,
Lincoln, Neb.

D. S. FAIRCHILD, President,
Clinton, Ia.

Notices and Reviews.

"A Clinical Text-book of Medical Diagnosis. By Oswald Vierordt. Authorized translation, with additions by Francis H. Stuart, A. M., M. D. Fourth revised edition. 1898. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. Cloth, $4.00 net; sheep or half morocco, $5.00 net.

A review of this, the fourth American edition, translated from the fifth German edition of this well-known and jusly valued work on diagnosis, seems almost superfluous. The fact that four editions have been demanded in the short time elapsing since its first appearance to the American profession is evidence that the work was needed and that it fills the need. In our opinion there is no more encouraging "sign of the time" than the increasing demand for works on scientific diagnosis.

The work has been thoroughly revised by its author and those parts of the work which cover the subjects which are growing and changing most rapidly have been largely rewritten. Thus we find material additions to the chapters upon the nervous system and to those which cover chemical and bacterial methods. The chapters upon purely physical methods of examination are not materially changed. Because of the rapid growth of certain means of diagnosis the translator also has found it necessary to make some additions.

Some of the newer methods and instruments are not described with as much detail as would seem necessary. Thus the phonendoscope is mentioned, in our opinion, too flatteringly, but no details of its structure or use are given. Litten's diaphragmatic phenomenon is fully described. The Widal test for typhoid fever is given, and as just an estimate of its value as is yet possible is made.

Mechanically the book is a credit to its publishers. The very full index and the number of cross references, together with the free use of heavy type, make the book an easy one to use.

The book can be recommended to students and practitioners as the best of its kind.

ROBERT B. PREBLE.

"A Text-Book upon the Pathogenic Bacteria, for Students of Medicine and Physicians," by Joseph McFarland, M. D.; second edition; p. 497, 1898. Philadelphia, W. B. Saunders. Chicago, W. T. Keener. Price $2.50 net.

The appearance of the second edition of this book, with the numerous and valuable additions, will be very welcome to the many friends which the first edition had made. It is now one of the very best books for students in any language, and is most satisfactory as a guide in the practical study of pathogenic bacteria. The additional 150 pages are occupied by considerable matter relating to subjects treated of in the earlier edition, and by new chapters dealing with the bacteriology of whooping cough, mumps, yellow fever, hog cholera, swine plague, the bacillus aërogenes capsulatus, and the Proteus vulgaris. Sections have also been added describing the methods of determining the value of antiseptics and germicides, and of determining the thermal death point of bacteria. There are about 20 additional illustrations.

The author has wisely given references at the foot of the pages to many original papers, which is certainly of value to a certain number of students. There might be some criticism regarding the author's disposal of the pseudodiphtheria bacillus. The more recent findings in hydrophobia are not mentioned, although the equally uncertain bacterium of syphilis is described in detail. The book as a whole is one to be recommended, and must certainly find a most useful place in the library of the student of medicine.

The work of the publishers has been well done and leaves little to be desired in that regard.

GEORGE H. WEAVER.

PAMPHLETS RECEIVED.

"Surgical Clinic; Surgical Clinic at the Northwestern University Medical School; A New Method of Controlling Hæmorrhage of the Scalp," by F. C. Schaefer, M. D., of Chicago.

"Appendicitis; Its Differential Diagnosis; Prevention of Shock; Remarks on Atypical Appendicitis," by Hugh M. Taylor, M. D., of Richmond, Va.

"Diseases of the Lachrymal Passages,

Their Causes and Management; The Prevention of Diseases Now Preying Upon the Medical Profession," by Leartus Connor, A. M., M. D., of Detroit.

"Changes in the Rates of Charge for Railway and Other Transportation Services," by H. T. Newcomb, Division of Statistics, U. S. Department of Agriculture.

"Glaucoma with Detachment of Retina; Orthoform and Extract Suprarenal Glands," by W. Cheatham, M. D., of Louisville, Ky.

"Insomnia," by I. J. Higgins, A. M., M. D., of New York.

"Post-Operative Insanity," by R. Harvey Reed, M. D., of Rock Springs, Wyo.

"A Contribution to the Study of the Symptoms of Chronic Urethritis," by Ferd. C. Valentine, M. D., of New York.

"Some Remarks Concerning Rectal Affections," by Lewis H. Adler, Jr., M. D., of Philadelphia.

"Advances in the Domain of Preventive Medicine," by J. M. G. Carter, M. D., of Waukegan, Ill.

"Preparation of the Patient for Operation; A Contribution to the Surgery of Gastroptosis and Enteroptosis," by Byron B. Davis, M. D., of Omaha, Neb.

"The Advantages of Physical Education as a Prevention of Disease," by Charles Denison, A. M., M. D., of Denver, Colo.

Mr. W. B. Saunders of Philadelphia announces the following works as in active progress and to be issued about the dates given:

"Stengel's Pathology," October 1.

"A Text-book of Obstetrics," by Barton Cooke Hirst, October 15.

"American Pocket Medical Dictionary," October 1.

"An American Text-book of Diseases of the Eye, Ear, Nose and Throat."

"Mental and Nervous Diseases," by Church and Paterson.

Mr. Saunders also announces that he closed a contract with the publisher of Lehmann's "Hand Atlanten," for 100,000 copies of each of the atlases. The central publisher has agreed to insert additional colored plates in each of the volumes, yet they will be sold at the usual low price. In this connection it may be pointed out that the enormous outlay necessary to secure the best artistic and professional talent for the atlases has only been made possible by the expense being shared by eleven publishers, for the atlases are published in nine languages, German, English, French, Italian, Spanish, Hungarian, Russian, Danish and Swedish.

Railway Miscellany.

Obituary.

James A. Elder, formerly president of the Emittsburg railroad, died at Emittsburg, Pa., September 10, at the age of 68 years.

Joseph Bayle, formerly president of the New Orleans & Carrollton, died at New Orleans, La., September 8, at the age of 65 years.

L. A. Jackson, chief clerk to the purchasing agent of the Pittsburg & Lake Erie, died suddenly at Pittsburg, Pa., September 29, of heart disease.

J. M. Allison, local freight agent of the St. Louis, Chicago & St. Paul and Chicago, Peoria & St. Louis at East St. Louis, Ill., died at his residence in Venice, Ill., September 22.

O. E. Woods, roadmaster of the Iowa & Dakota division of the Chicago, Milwaukee & St. Paul at Mason City, Iowa, was instantly killed in a wreck on that road at Fostoria, Ia., October 1.

Thomas Collins, a veteran railway contractor and a member of the firm of Collins Bros., died at his home at Bellefonte, Pa., September 25, at the age of 75 years. The firm of which he was a member did most of the construction work for the Pennsylvania Railroad during its early history and subsequently helped to build the Philadelphia & Reading, Lehigh Valley, Central of New Jersey and other roads.

J. C. Gregory, formerly division superintendent of the International & Great Northern, but for some time past freight conductor on the Oregon Short Line, was killed while coupling cars at Feely, Mont., Sunday, September 25. He was born June 30, 1855, and entered railway service in May, 1876, as brakeman on the Galveston, Harrisburg & San Antonio. He subsequently served as baggagemaster and conductor on the same road until June, 1879, when he went to the International & Great Northern as baggagemaster. He remained in the continuous service of the latter road until June, 1895, serving successively as follows: Nine months as baggagemaster; three months as freight brakeman; two years as freight conductor; nine years as passenger conductor; May, 1891, to June, 1895, trainmaster, and June, 1895, to July, 1896, as division superintendent, located at Palestine, Tex. From September, 1895, to July, 1896, he was also superintendent of the Galveston, Houston & Henderson.

John M. Toucey, late general manager of the New York Central & Hudson River, died at Fishkill Landing, N. Y., September 23, at the age of 70 years. He was born in 1828 at Newton, Conn., and entered railway service in

1848 as station agent of the Naugatuck Railroad, which position he held for seven years. From 1855 to 1862 he was connected with the Hudson River Railroad, now a part of the New York Central & Hudson River, in various capacities, and from 1862 to 1867 he was assistant superintendent of the same road. In 1867, when that road became a part of the New York Central & Hudson River, he was given the title of superintendent of the Hudson River division, which office he held until 1881, when he was appointed general superintendent of the entire system. After serving nine years in that position he was appointed general manager, in 1890. When S. R. Callaway assumed the presidency of the New York Central on May 1 last, he abolished the position of general manager and appointed Mr. Toucey assistant to the president, but the latter preferred to retire from active railway work and tendered his resignation. He had been in poor health for several months past and had been confined to the house for about two months.

Southern Railway.

Press dispatches state that this company contemplates building a line from Reidsville, southwest to Kernersville, N. C., about thirty miles, and also from Mt. Mourne southwest to Gastonia, N. C., about thirty miles, in order to connect different sections of the system and give a new through line. These extensions would effect a saving in distance of about fifteen miles between Gastonia and Reidsville.

Reports of Trains Parted.

J. W. Thomas, Jr., assistant general manager Nashville, Chattanooga & St. Louis Railway, has recently inaugurated a system of records of trains parted, the practical operation of which has been to reduce by more than one-half the total number of cases occurring. The reports are tabulated each month by divisions. The tables include the date, numbers of train and engine, names of conductor and engineman, number of cars loaded and empty, the number of serviceable air-brake cars, the cause of parting and remarks. Each entry, therefore, embraces a brief but complete history of the case.

The records themselves have been kept since February 1 last, and it is the intention hereafter to tabulate the reports promptly each month and post them upon the bulletin boards. The existence of the reports has had the result stated, of materially reducing the number of cases of trains parting, owing to the particular attention which it thus directed to the matter.

A sample report for one division of the road is hereto appended, the names of conductor and engineman being omitted.

TRAIN PARTED REPORT CHATTANOOGA DIVISION—AUGUST, 1898.

No.	Date	Train No.	Engine No.	Cars. Ld.	Cars. Mt.	Bad air cars.	Cause.	Remarks.
1	2	7	114	16	1	3	Slip-pin gave way	Head of slip-pin in S. I. C. L. 53718 pulled off; poor iron, old flaw.
2	4	10	97	27	0	11	Draft timber bolts gave way	Draft timber bolts in S. & R. 275 gave way; evidence of rough handling.
3	5	12	130	14	5	7	Slip-pin key lost	Train parted as it was being started from station; evidence of rough handling.
4	8	9	85	18	0	9	Link broken	Iron good: evidence of rough handling.
5	11	16	87	4	28	11	Pin pulled	Conductor claims someone pulled pin while train was standing at station.
6	12	9	92	22	0	6	Slip-pin pull'd thro' end of drawbar	Head of slip-pin in S. I. C. L. 1067 badly worn.
7	13	15	143	27	0	12	Draft timbers broken	Evidence of rough handling.
8	14	8	85	13	6	3	Slip-pin key gone	Slip-pin key worked out going down mountain.
9	14	15	148	26	0	15	Knuckle broken	Knuckle in St. L. R. C. Co. 674 broken in starting; evidence of rough handling.
10	15	17	85	16	0	12	Slip-pin key lost	Slip-pin key lost out of C. H. & D. 11452: train was running along with light throttle.
11	16	16	25	11	11	13	Slip-pin key jerked in two	Three sections coupled together coming down mountain; all had trains partially equipped with air; first man thought he was going to run by switch and called for brakes; second man applied brakes lightly, instead of bringing train to stop as per instructions, first man whistled off brakes, and as brakes released train parted.
12	17	14	93	11	12	10	M.C.B. coupler parted	Conductor could not tell which buckle opened.
13	18	10	119	1	19	13	Draft timbers pulled out	Draft timbers in N. C. & St. L. 1608 rotten, car being brought to shops for repairs.
14	20	4	104	9	0	9	Link broken	Solid link between engine and postal car broken; link showed old flaw.
15	24	13	108	0	18	18	Miller drawbar pulled in two	Train consisted of 18 tourist cars; Miller drawbar had old break and pulled in two as engineman released brakes to pull in siding.
16	24	12	25	8	16	18	Slip-pin gone	M. C. B. coupler in S. I. C. L. 1966 fell on track, derailing two cars; track blocked 2¼ hours.
17	31	13	94	18	0	6	Slip-pin broken in keyway	Slip-pin key in N. C. & St. L. 8139 gave way through keyway; old flaw.

An interesting experiment to determine the best wood for telegraph poles and the best manner of setting them is in progress on the Philadelphia, Wilmington & Baltimore road. About 40 poles have been set for the purposes of the experiment. There are six chestnut poles, cresoted; six pine poles, cresoted; six chestnut poles, treated with woodiline; six set in broken rock, six in clay, six in the ordinary manner, and six to have a hole pored near the ground so that they can be saturated with oil.

Railway Construction for Nine Months.

Not less than 1,000 miles of track have been laid in the United States since July 1. This, added to the 1,182 miles put down in the first half of the year, makes almost 2,200 miles for the nine months ending September 30. The above has no reference to renewals or second track and sidings, but means that 1,000 miles of new railroad have been built in the last three months. If this ratio of increase keeps up until December 31 the close of the year will see not less than 3,000 miles of new road built in 1898, with many hundred miles more under way to be completed in 1899. There is enough work in progress to bring the total up to 3,000 miles without difficulty, unless something unforeseen occurs to cause delay.

The first half of the year is necessarily one of preliminary work largely, and it is a matter of history that the number of miles of track laid in the first six months of any year equals about one-third of the total mileage for the year. A number of important lines which devoted the fore part of the year almost exclusively to grading are now laying track rapidly, and many miles of new road are being added daily to help swell the total for the year. Notable among these are the Pecos Valley & Northeastern, which is building from Roswell, New Mexico, to Amarillo, Tex., 206 miles, and which has not laid over one-third of the track; the St. Louis & Oklahoma City, which is being rapidly completed from Sapulpa, I. T., to Oklahoma City, 103 miles; the Soo Line, which is pushing its extension from Kulm, N. D., northwest 78 miles toward Bismarck, and the Washington County Railroad, which is just completing tracklaying on 118 miles of road between Calais and Ellsworth, Me.

The 2,200 miles of road built during the first nine months of 1898 exceed the total mileage for any entire year since 1893, when 2,635 miles were completed. In 1894, 1,948 miles were added; in 1895, 1,728 miles; in 1896, 1,848 miles, and in 1897, 1,880 miles.

Over one-half the mileage built thus far this year is distributed among nine states, as follows: Minnesota, 166 miles; Texas, 147 mile; Alabama, 145 miles; Arkansas, 130 miles; Louisiana, 129 miles; Missouri, 117 miles; Oklahoma, 105 miles, and North Carolina, 104 miles. This makes a total of 1,166 miles in the eight states and one territory named, and several other states are not far from the 100-mile mark. Tracklaying has been confined to 38 states and territories and no new mileage has been added in Connecticut, Iowa, Kansas, Massachusetts, Nebraska, Nevada, New Hampshire, New Jersey, Rhode Island, Utah, Vermont and Wyoming. Alaska this year joins the list of territories in which railway construction is in progress and contributes 20 miles of road, extending from Skaguay, north through the White Pass to the international line.

Railway Statistics for 1897.

Advance sheets of Poor's Manual of Railroads for the year 1897 are to hand, containing the following comparative summary of the results of the operation of the last two years:

	1897.	1896.	Increase or Decrease.	Rate of Inc. or Dec.
Miles of railroad operated	181,132.70	180,891.19	241.51	1.13
Tons freight moved	788,385,448	773,868,716	14,516,732	1.88
Freight mileage	97,842,569,150	93,885,853,634	3,956,715,516	4.21
Passengers carried	508,406,525	535,120,756	*31,014,231	5.80
Passenger mileage	12,494,958,000	13,054,840,243	*559,882,243	4.29
Earnings from frght.	$ 780,351,939	$ 770,424,013	$ 9,927,926	1.29
Earnings from pass.	253,557,936	265,313,258	*11,755,322	4.43
Miscel. earnings	896,360,791	89,894,754	*257,963	0.29
Total gross earngs.	$1,123,546,666	$1,125,632,025	$ *2,085,359	0.19
Net earnings	338,170,197	332,333,756	5,836,439	1.76
Earnings per ton per mile	0.798 cent.	0.821 cent.	0.023 cent	2.80.

*Decrease.

The share capital corresponding to the mileage completed at the end of 1897 equaled $5,621,340,647, against $5,373,187,819 in 1896, the increase equaling $248,152,828, the rate of increase being 4.6 per cent.

The funded debts of all the lines at the close of the year aggregated $5,516,056,292, against $5,461,856,598 in 1896, the increase equaling $54,199,694, being an increase of .99 per cent.

The other forms of indebtedness of the several companies at the close of the year equaled $380,769,705, against $344,499,969 for 1896, an increase of $36,269,736. The total share capital and indebtedness, exclusive of current accounts of all the roads making returns, equaled at the close of the year $11,518,166,646, an increase in the year of $338,622,260 over the total of 1896 ($11,179,544,386), the rate of increase for the year being 3.3 per cent.

The cost per mile of all roads making returns, as measured by the amount of their stocks and bonded indebtedness, equaled $60,679, against $59,732 for 1896.

According to the Manual there are 211,929 miles of steel rail in track and 24,984 miles of iron rail. The equipment for eighteen years is given as follows:

		Revenue Cars.			
Year	Locomotive Engines.	Passenger.	Baggage, Mail and Express.	Freight.	Total.
1880	17,949	12,789	4,786	539,255	556,990
1881	20,116	14,548	4,976	648,295	667,819
1882	22,114	15,551	5,566	730,451	751,568
1883	23,623	16,889	5,848	778,663	801,400
1884	24,587	17,303	5,911	798,399	821,613
1885	25,937	17,290	6,044	805,519	828,853
1886	26,415	19,252	6,325	845,914	871,491
1887	27,643	20,457	6,554	950,887	977,898
1888	29,398	21,425	6,827	1,005,116	1,033,368
1889	31,041	22,885	7,053	1,051,169	1,081,107
1890	32,241	22,958	7,253	1,061,970	1,092,241
1891	34,022	24,497	7,368	1,110,504	1,142,169
1892	35,099	26,044	7,830	1,159,040	1,192,920
1893	36,486	28,624	7,805	1,203,476	1,239,905
1894	36,764	27,921	7,921	1,228,799	1,264,641
1895	37,090	27,979	7,891	1,230,817	1,265,687
1896	36,080	24,788	7,849	1,240,061	1,272,688
1897	35,810	25,275	8,133	1,229,335	1,262,473

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SURGERY OF SEVERED TENDONS IN INFECTED REGIONS.*

BY FRANCIS B. FITE, M. D., MUSCOGEE, IND. TER.

Extensive incised, contused or lacerated wounds involving and severing tendons which have become infected, are with great difficulty rendered aseptic, if not impossible to entirely do so; that is to say, cleansing to that extent that the required operation, suturing the tendons, can be accomplished in such a way that the wound can be closed and the result be immediate union and repair without pus formation. In many instances so thoroughly and extensively have the injured tissues been exposed to opportunities for, if not positive infection, to attempt to accomplish this (being compelled as you likely would, to use effective antiseptics such as bichloride solutions in sufficient strength), great damage to the tissues and parts you expect to unite would more than likely result. Suppuration and probably sloughing would follow, thus defeating the purpose of the operation.

I remember not many years ago a man came into our office with his hand terribly mangled by machinery. In this, as in all other cases where muscles and tendons are involved, with a reasonable degree of certainty that the wound had become infected, we not only had to determine as to the extent of tissues to be sacrificed, but cleansing and rendering the parts aseptic as well, which was attempted by the usual methods, and the use of one to three (1-3000) thousand bichloride rather freely before and during operation. The result was, the stump gradually became inflamed and finally suppurated in a moderate degree, and part of the flap sloughed in spite of extra precautions at cleanliness and in the use of antiseptics. The drainage was ample for a clean operation, and the flaps were sufficient. I attributed the failure to get immediate union in part to the use of the bichloride, resulting in more or less necrosis of some of the less vital tissues favoring the development of infection then present or afterward gaining entrance. All will agree that tendons should be sutured, whether in infected or aseptic regions, in order to properly restore the use and function of the parts involved. When we have made the incision in healthy tissues under the proper antiseptic precautions, the operation is comparatively simple and the result usually as we desire. But quite different results may be anticipated in infected regions unless the proper precautions in treating the injury have been observed.

Marcy, in an able article, read less than a year ago, before the British Medical Association, at Montreal, states: "Notwithstanding the revolution in surgical methods which was instituted by the immortal Lister, with the consequent improvement in suturing and suture materials, in a large minority of wounds made in healthy tissue under the best aseptic surroundings there will be more or less suppuration." Naturally injuries are more readily made suitable for final closing, and healing less troublesome when we have cleansed them with the least possible interference, and have not sought after retracted tendons, enlarging the wound as we are often compelled to do, thereby partially destroying, or at least crippling further the delicate tissues involved, laying them liable to a still greater infection.

Being called to an injury involving several tendons, the surgeon's attention will not likely be drawn to the tendons, except possibly by the over action of the opposing muscle, as their divided ends have retracted and as a rule

* Read at the eleventh annual meeting I. A. R. S., Toronto, 1898.

are out of sight, and it is the bleeding injury, the inflamed tissues and the immediate wants of the patient that occupy the surgeon's attention at first. But we must not forget the responsibilities resting upon us, and before the injury is dressed we must secure the divided ends of the tendons and reunite them. In infected wounds bringing the tendon ends together and stitching them is probably no more difficult than in non-infected ones. But in dealing with infected tendons and tissues we are at a disadvantage in attempting to render the tissues aseptic, because we have no tendon tissue to spare, therefore cannot well afford to cut away the doubtful parts; and must dress the wound expectantly. Some necrosis necessarily follows. More or less pus formation, necessitating drainage, drainage that is prompt, effective and easy, so that nature in the effort to repair the injury will not only be able to throw off the refuse, but cast it out as well. Often drainage is quite as useful as antiseptics and probably more in some instances. Especially is this true in my experience, in such cases as I shall report in this paper. If, in the attempt of antisepticising an injury, we could be sure of the limit we are permitted to go without injury to the delicate tissues and that we are successful within that limit, then we could close the wound and there would be no necessity for the drainage. Unfortunately so, but we are unable to draw these lines, and say when our cases are not further septic. Without proper drainage in even questionable cases we are very apt to get the worst of it. We must keep on the safe side. The end may be longer coming, but the result will be more satisfactory to the surgeon as well as the patient. Suturing tendons is not very unlike suturing bones, and it is of the highest importance that where there is the least infection lurking behind capable of resulting in any degree of pus formation, drainage should be provided, remembering that pus travels in the line of the least resistance, and is very prone, as it often does, to make its way along the sheaths of the tendons, doing great damage if not evacuated.

The latter part of last January I was called to see a hotel keeper of our town who had been cut with an old razor an hour or so before I saw him, completely severing the extensor tendons of the fingers of the left hand. The cut was almost entirely across the back of the hand midway between the wrist and the metacarpo-phalangeal articulations, and all of the soft tissues were divided down to the bones and had bled freely. In order that his wife should not discover that he had been cut the patient had washed his hand in foul pond water, and had wrapped the wound in a soiled handkerchief. When I reached him the bleeding had about ceased, but the wound was in a sad plight surgically. The tendons retracted, fingers flexed and useless, cut surfaces well apart and the parts injured had been thoroughly saturated with the filthy materials in the water used in washing away the blood and checking the hemorrhage. The wound was made as nearly aseptic as we thought possible. With some difficulty we secured the retracted tendons' ends, pared them off and stitched them together with iron dyed silk. Several stitches were required, wound was drained at two points with rubber drainage tubes, and closed with interrupted silk suture, dressed with moist or oily dressing, consisting of 5% balsam Peru in castor oil, gauze, etc., supporting the hand and forearm with splints so applied as to relieve the tension on the stitched tendons. The oil was boiled to make sure that it was aseptic. The dressings were changed daily, which is easy and painless comparatively speaking. The inflammation and swelling was not extensive but was localized, concentrating about the injury by degrees from the beginning. There was very little pus formation, several sutures were removed during the course of treatment through the openings for drainage, which was maintained. The wound was never irrigated after the first dressing. Every tendon united and the man regained excellent use and control of his hand and fingers.

In the summer of 1896, J. B., a laborer in a planing mill, came rushing into our office saying he had almost cut his hand off with a rip-saw. It was bleeding rather freely from a very extensive cut and lacerated wound about an inch behind the metacarpo-phalangeal articulations and extending clear across the palmar surface of the hand, cutting and lacerating the soft tissues down to the metacarpal bones, and slightly injuring two of these. All the flexor tendons were cut, and the fingers were in an exaggerated degree of extension.

Hemorrhage controlled, wound prepared for dressing, the tendons of the fingers were readily secured by forcibly flexing the fingers. With the proximal ends we had considerable trouble, as they had retracted as far as the annular ligament. We were compelled to make an incision at right angles to the injury and at the same time bandage tightly the forearm from the elbow to the wrist in order to reach them. The tendons were very much lacerated and we were obliged to sacrifice a portion of each to a disadvantage. As in the preceding case the tendons were arranged in pairs and carefully sutured with silk, except we used some heavier sutures in this instance as the tension was greater. The wound was closed with silk. Owing to the character of the wound and the condition of the tissues and the opportunity for infection we concluded it would not be safe with or without drainage to expect union by first intention, and we dressed and drained the wound in the same manner as in the preceding case. There was never very much inflammation and suppuration. During the course of the treatment several sutures were removed through the opening for the drainage. As far as we could tell every tendon united. The man has good use of the hand and fingers, and still holds the position in the mill he had before the accident occurred.

A few years ago I was called to see a man who was kicked by a horse on the knee, fracturing the patella. The patient had been under the treatment of other physicians for two months before I was called, who had kept him in bed with his knee dressed with a posterior splint and a figure of eight bandage. On examining the knee I found a great amount of tumefaction and swelling about the seat of the injury, and to some extent throughout the whole limb. I was quite sure I could detect fluctuation. The knee was at least three times as large as the other. The patient had fever, had lost flesh, and showed evident symptoms of sepsis. There was evidence of injury of the skin over the knee-cap where he had been kicked by the horse, but the skin had healed. I advised an operation, which was agreed on, and an incision was made immediately over the knee-cap. On reaching the joint a great quantity of pus, mingled with more or less blood, escaped, establishing the fact of infection and suppuration. The region was cleansed as thoroughly as possible by irrigation, the patella was found to be fractured into three fragments, with at least two and a half inches separation. The edges of the fracture were freshened. The injury and the necrosis going on had greatly damaged the tendon as well as the other tissues involved. One of the fragments had almost become separated from its tendinous attachment. Drilling holes for our suture, we brought the fragments together with heavy silk, introducing them in such a way as to include the tendon where the upper fragment was partially detached. The joint and the wound were thoroughly drained and closed with silk. After treatment, similar to other cases. All sutures were removed some time afterward, fracture united, the man recovered, with fairly good motion and use of the knee, and you can hardly detect any indication of an injury in his walk. He has since served eighteen months in Columbus penitentiary for selling whisky to the Indians, and is now farming.

The points of this treatment are: Its application in wounds which we cannot close, and expect immediate union for fear of infection, and resulting suppuration. The drainage maintained throughout the course of treatment, which appears to favor the repair of the tendons in this class of injuries. The service of the sutures until they can be removed, if necessary. The dressing with the balsam and castor oil, which is unfavorable to germ development, stimulates a healthy condition, and assists in maintaining a drainage. Its easy application and the results obtained in infected regions. I do not claim that the methods here employed are either very new or scientific in technique or otherwise, but were employed because they appeared to meet the indications in these and similar injuries.

Would state kangaroo tendons would probably answer the same purpose in suturing the tendons, but I have never employed them.

DISCUSSION.

Dr. George Ross, of Richmond, Va.: Every surgeon has had occasion at some time or other to suture tendons. I recall one case in which I sutured the tendo-Achilles which was separated for four inches. The man had a good leg, and perfect union was secured,

so that he is as well to-day as he ever was, and attends to his work. In this case I did the suturing with catgut.

Dr. Milton Jay, of Chicago: The paper has brought to our attention that phase of surgery which is always interesting, for several tendons that are not united must necessarily mean a useless limb, and it is very important to suture the tendons properly in order that union may take place. We can draw down the tendons and suture them if the tissues round about are not infected, and they will unite. If the wound is treated antiseptically generally the tendons will unite, and although we may have some infection, if the case is properly treated, and the wound kept clean, union of tendons will sooner or later occur.

Dr. A. I. Bouffleur, of Chicago: I desire to call attention to one or two points in connection with the suturing of tendons, and the first one is that we sometimes forget the fact that the tendons are avascular structures, and therefore we must not expect the tendons to get well too quickly. All tissues heal by the production of granulation tissue, and whether by primary union or not, it is a form of granulation tissue, and this means that an excessive amount of blood supply must be given off. It will take the blood vessels in the cut ends quite a while to develop granulation tissue, and that is the reason why in so many cases of injury to tendons we have what is called ligamentous union. Let us take a fracture of the patella, for instance. If we treat it as a tendon, while there is an unusual amount of blood there on account of bone formation, yet there is not near the amount there that there should be to have it heal like ordinary bone structure would heal. When we treat a fracture of the patella we treat a somewhat avascular structure, and expect permanent union to occur sooner or later, and if we keep the limb in position so that granulation tissue may form and union occur, we will have less ligamentous union than at the present time.

The next point is that ordinary tendons are practically avascular, and it takes a good deal of time before granulation tissue is produced, and, therefore, before union takes place. Keep the parts at rest. Not only this, if you are going to keep them at rest, it is necessary to cover the points of suture, because when you begin to use the tendons you will find they are grown fast to the tissues surrounding them. Any number of tendons are sutured which do not unite, but this is due to one of three conditions, either that function has been attempted too soon, or that union has occurred but the tendon has become attached to the surrounding tissues, or infection has occurred. We know that infection in avascular tissue is destructive, because the resistance to infection is very slight. The destruction is marked, resistance is limited, and consequently we want asepticity. We want rest, and we also want provision made and rest kept up long enough so that the tendons may not become united to the adjacent structures. I usually use catgut or kangaroo tendon in my surgical work for the purpose of suturing tendons.

Dr. Fite (closing the discussion): Reference was made by Dr. Bouffleur to the class of cases in which we have aseptic wounds and not where we have infection. It is quite different when we have a suppurating wound to deal with, and have got to drain. In such cases we cannot use catgut, because I do not believe it would hold the tendon long enough to bring about union. Kangaroo tendon may be used to advantage in these cases, although I have not tried it.

"FIRST AID" CLASSES FOR RAILWAY MEN.*

By Charles R. Dickson, M. D., Toronto.

The old proverb, "Accidents will happen in the best regulated families," is as true to-day as ever it was. The modern railway, although an exceedingly well regulated family, is no exception to this rule, for in spite of all precautions and the employment of every means that tireless human ingenuity can devise to reduce to a minimum the possibility of mishap it too has its accidents, many of which occur in localities far removed from immediate surgical relief, entailing hours of great suffering, or perchance death, that might not have taken place had the services of a surgeon been at once available.

I am not aware that any railway company has seriously considered the advisability of providing a surgeon for each of its trains in

*Read at the eleventh annual meeting I. A. R. S., Toronto, 1898.

order to add to the comfort and increase the safety of its patrons, should an occasion arise necessitating immediate professional attention. The plan is hardly feasible, in fact the surgeon himself might be incapacitated at the same time as his prospective patients. It is possible, however, for any railway company to be in a position to say truthfully that every train on its system, freight as well as passenger, is manned by a crew, every man of which is able when necessary to intelligently render appropriate preliminary assistance to passenger or fellow employe, nay more, that every member of its staff is so qualified; such assistance is termed in ambulance parlance, "First Aid to the Injured."

Let us consider for a moment the scope of this assertion: briefly stated it means that a brakeman may, on occasion, save a life by controlling an otherwise fatal hæmorrhage, that a fireman may prevent a simple fracture from receiving further injury and becoming compound or complicated by the intelligent use of extemporized splints pending the arrival of a surgeon, that a conductor may be able to discriminate the various forms of insensibility due to apoplexy, epilepsy, fainting, hysteria, concussion, alcoholic or other poisoning, and render necessary preliminary assistance using available means, that he appropriately apply preliminary dressings to wounds, that he knows how to carry out artificial respiration when a train has gone down an embankment or through a bridge into a river, and may be able to resuscitate men who have been hauled out apparently drowned, that trainmen can extemporize and apply first aid bandages in a manner that would astonish the uninitiated, it means that the yardsman may render most valued assistance to his fellow laborers, it means that the wounded or sick may be removed with the greatest degree of available comfort and safety, all this without interfering in the least with the work of the surgeon, but on the contrary, very materially enhancing and lightening his subsequent labors when he arrives on the scene.

Lest some of you feel inclined to protest that the picture which I have drawn is of altogether too roseate a hue, let me say that all this and much more is possible and practicable by means of the instruction of railway men in the principles and practice of First Aid by their surgeons.

This instruction has been so systemized by The St. John Ambulance Association that a simply enormous amount of information can be conveyed in a most practical manner in an incredibly short space of time to those who possess ordinary intelligence.

To show the manner in which the English railways recognize the value of the labors of this Association, permit me to cite a few instances from the last available report of 1896-7. The North Eastern Railway leads the van, in the formation of a special "Railway Centre," for the instruction of members of its staff in First Aid work, an example followed by many others, the Great Western, the Great Eastern, etc. The London & North Western encourages its employes in ambulance work by means of a challenge shield and prizes annually competed for; the directors of the Midland offer gold and silver badges to those in their service who have rendered the most valuable assistance in cases of accident; the Great Eastern divides its system into sixteen sections, in each of which an annual competition takes place between individuals, and between stretcher parties, a series of three prizes (six in all) being awarded in each competition, and many other inducements are held out to its employes to qualify. In the spring of 1895 it had an aggregate of 840 officers and men who had rendered aid in upwards of 900 cases during the year. This is pretty good testimony of the value of First Aid methods coming from such a conservative people as the English are supposed to be in railway matters. As an instance of how the Englishman like the busy bee doth "improve each shining hour," I cannot refrain from citing a final case: Sir Vincent Barrington (Deputy-Chairman of the Association) while on his mission to Venezuela, organized a system of First Aid classes at the capital, Caracas, held under the auspices of the Venezuelan Red Cross Society, the first course being given at the University by its rector, and attended by the members of that body and a detachment of the police, was followed by a course at the station of the La Guaira and Caracas Railway Company for its employes, given by the vice-rector of the university. President Crespo gave his hearty

support to the extension of the ambulance movement to Venezuela, and through his diplomatic representatives is encouraging its further extension among neighboring republics.

Not to needlessly lengthen my paper I cite one example from this report of First Aid efficiently rendered, as it is so characteristic. It is given by a medical man: "A man named Tucker, employed by the Midland Railway Company, was run over by some wagons, and received a compound comminuted fracture of the thigh, the femoral artery being injured. His comrade, a 'number taker,' named William Alfred Smith, promptly controlled the arterial bleeding by means of an improvised tourniquet in the shape of an ordinary towel, put the limb in splints, and had the patient carefully conveyed to the Nottingham General Hospital. When the house surgeon took off the tourniquet the artery commenced to spurt again, and he said that the man's life had been certainly saved by the prompt application of First Aid, for otherwise the patient must have bled to death in less than twenty minutes. These facts have been communicated to the Midland Railway Company, and they have awarded Smith a silver medal."

None are in a better position to realize the manifest advantages of First Aid in such cases than are the members of The International Association of Railway Surgeons, and none can more fully appreciate how useful First Aid classes for railway men should prove, hence, when your popular chairman of the committee on arrangements was kind enough to suggest and request that I read a short paper on the subject before you, I appreciated the compliment, and was much pleased to accept his invitation, more particularly as I knew that the subject was one in which he was much interested.

The method adopted in the formation of First Aid classes is as follows: In order that each may receive the full benefit of personal instruction by the lecturer, the men are formed into classes limited to thirty in each, but a much smaller number may constitute a class, one man acts as secretary of the class, keeping a roll on which is entered the name, address, occupation, and attendance of each, he also performs the duties of treasurer, should such be necessary. None but duly qualified medical practitioners are allowed to deliver lectures, such only being capable of judging where ambulance properly ends, the function of the ambulance pupil being to prepare for, not to supplant, the medical practitioner, and no lecturer is allowed to examine his own class.

The lectures, which are five in number, are usually given at intervals of a week; they are as follows:

First Aid to the Injured, First Lecture.—Preliminary remarks, objects of instruction, etc., a general outline of the structure and functions of the human body, including a brief description of the bones, muscles, arteries and veins. The functions of the circulation, respiration, and of the nervous system, the Esmarch triangular bandage, and its application.

Second Lecture. The general direction of the main arteries, indicating the points where the circulation may be arrested by digital pressure, or by the application of the tourniquet, the difference between arterial, venous and capillary bleeding, and the various extemporaneous means of arresting it, the triangular bandage.

Third Lecture. The signs of fracture, and first aid to be rendered in such accidents. The application of splints, or other restraining apparatus. Treatment of sprains, the triangular bandage.

Fourth Lecture. First aid to those suffering from collapse from injury, to those stunned, to the apoplectic, inebriated, epileptic, fainting, and to those bitten by rabid animals; the immediate treatment of the apparently drowned, or otherwise suffocated; burns, scalds and poisons; what to do when clothing catches fire.

Fifth Lecture. The improvised method of lifting and carrying the sick or injured; methods of lifting and carrying the sick or injured on stretchers; the conveyance of such by rail or in country carts.

NOTE I.

The subject of poisons should be treated in a general manner. The common poisons classified, and only their general symptoms and effects taught. With regard to the treatment, the first indication, viz., how to get rid of the poison, is the only one which can be safely practiced by non-professional persons.

The administration of antidotes is the medical man's duty.

NOTE II.

The last half-hour of each lecture should be devoted to practical work, such as the application of bandages and splints, lifting wounded and carrying on stretchers.

NOTE III.

There should be an interval of a week between each lecture. A candidate for examination must attend at least four out of the five lectures.

One week or more after the final lecture, an examination is held, both written and practical; the written consisting of questions on the subjects above mentioned, the practical being on the neat and quick application of the triangular bandage to any part of the body; the arrest of hæmorrhage by pressure of the fingers on the main arteries of the limbs; the application of splints and bandages for any fracture; performing artificial respiration; improvising stretchers; placing patients upon stretchers; carrying stretchers, carrying patients without stretchers.

To those who are successful in passing the examination, certificates are issued from headquarters at St. John's Gate. Failure to pass in the practical part is a bar to the certificate. After failure to pass, a fresh course of lectures must be attended before a candidate can present himself at another examination. In order to stimulate the keeping up of interest in ambulance work, one year from the date of his certificate, the holder may present himself for a further examination, attendance at lectures being optional, and if successful, is awarded a re-examination voucher, one year from the date of which he may go up for a final examination, and if again successful, is exempt from further examinations, and eligible for the medallion of the Association, which may be carried in the pocket, or worn as an ornament, but never as a decoration, and may be used when necessary as a certificate of competency to render first aid to the injured. The object of these subsequent examinations is to assure that the knowledge once acquired has not been forgotten. Railway employes who have obtained the First Aid certificate are entitled to wear the arm-badge of the Association.

The medal of the Order is awarded to those who, in a conspicuous act of gallantry in saving life on land, have endangered their own lives; it bears the motto: "For Service in the Cause of Humanity."

Previous to the formation of the Toronto Centre of the St. John Ambulance Association in 1896, First Aid classes of instruction in this city were held by Dr. Bruce L. Riordan for the employes of the Grand Trunk Railway, the first of which was held about six years ago. Last winter Dr. Riordan lectured to a class of twenty-two at the rooms of the Grand Trunk Y. M. C. A., taking them through the St. John Ambulance course. The class was, as might be expected, a most enthusiastic one, and in March last eleven of the members were examined by Dr. W. F. Gallow, and all succeeded in passing the examination; one member having been twice previously examined in England, obtained the medallion. We expect that during the autumn many classes will be held under the same auspices, and that ere long the old reliable G. T. road will have many a certificated pupil in its ranks, and not be one whit behind the English railways cited in this respect, and that at a future meeting of your Association someone will be able to report that not one railway represented by you but holds regular classes for the instruction of its employes in First Aid. About then Dr. Bruce L. Riordan will be referred to as the father of railway ambulance work in North America.

Fearing to weary you I have not alluded to many matters which are appropriate to this paper; for instance, the material required for classes; of course in actual practice there is no dearth of material for splints, stretchers, etc., usually, as those of you have witnessed a collision, for instance, are quite aware; but at the lectures we employ with advantage large physiological diagrams, comprising the human skeleton, the muscular, arterial and venous system, the heart and circulation of the blood, simple and compound fracture and dislocations; temporary splints such as umbrellas, canes, axe-handles, straw bottle-cases, broken cigar boxes, rolls of newspapers, etc., tourniquet—a knotted bandage or towel to be twisted tight with a stick; triangular bandages, made by cutting a 40-inch square of cotton in two pieces diagonally, or extemporized out of handkerchiefs, napkins, towels,

etc.; an extempore stretcher, a shutter, board, etc., etc.

The Ambulance Association has devised for special use in railway stations an ambulance hamper with waterproof cover and strap, weighing with contents 6½ pounds, length 1 foot 6 inches, depth 5 inches, width 7 inches. It contains one set splints, one elastic tourniquet, three tampons, two packets patent lint, four roller bandages (wide and narrow), four triangular bandages; cotton, wool, boric wool, patent plaster, these three in tin cases; knife, scissors, thread, needles, pins, etc.

The text-book used, Shepherd's "First Aid to the Injured," is a wonderfully concise little volume, containing less than a hundred pages of instructions, and of a size permitting it to be carried in the coat pocket.

For the benefit of those who desire to know more of the Association permit me to condense the following information from its literature:

The St. John Ambulance Association, of which the Prince of Wales is president, is the Ambulance Department of The Grand Priory of the Order of the Hospital of St. John of Jerusalem in England, an order originating at the close of the eleventh century for the charitable purpose of affording hospital assistance to the pilgrims visiting Jerusalem. The headquarters of the Association is in London, at St. John's Gate, all that now remains of the gateway of the once magnificent Priory of the English Knights.

The Ambulance Department is only one of many branches of useful and humane work carried on by the order; it was established in 1878 for affording instruction in the preliminary treatment of the injured in peace, and the sick and wounded in war. The objects of the Association are:

(a) The instruction of persons in rendering first aid in case of accidents or sudden illness, and in the transport of the sick and injured.

(b) The instruction of persons in the elementary principles and practice of nursing, and also of ventilation and sanitation, especially of a sick room.

(c) The manufacture, and distribution by sale or presentation, of ambulance material, and the formation of ambulance depots in mines, factories, and other centres of industry and traffic.

(d) The organization of ambulance corps, invalid transport corps, and nursing corps.

(e) And generally the promotion of instruction and carrying out works, for the relief of suffering of the sick and injured in peace and war, independently of class, nationality or denomination.

The motto of the order is "Pro Utilitate Hominum," Service in the Cause of Humanity.

It must be clearly understood that the object of the Association is not to rival, but to aid the medical man. The object of the training is to enable the pupil to place the injured in a position of safety until the services of a surgeon can be secured.

Detached classes of the Association have been held in this city for several years, besides those already noted, chiefly among the police, over 300 of whom hold the First Aid certificate, this department of work being in charge of Dr. E. W. Spragge, chief medical officer, but in February, 1896 through the efforts of Deputy Surgeon General G. S. Ryerson and myself, the Toronto District Centre of the Association was organized, and the police have now cast in their lot with us. We hope also to be in a position to afford instruction to the firemen of the city before long. Since our formation we have 31 classes attended by 783 pupils, of whom 556 have passed the several examinations, 22 of whom have qualified for the medallion, and the instances of most valuable First Aid rendered have been very many. We have also a Canadian centre embracing the whole Dominion, organized shortly before our local branch by Dr. Ryerson, the general secretary for Canada. Or to be more correct, in November, 1895, a provincial centre for Ontario was formed, which was enlarged to a Dominion Council in 1897. Over twelve hundred pupils have attended the classes of instruction, and the work is ever widening.

I think that I cannot bring this paper to a close more fittingly than by quoting from an article written by Dr. G. H. Darwin. After replying to the objection that a little learning is a dangerous thing by saying "A man may know the value of a little salt and water as an emetic, without knowing the constituent ele-

ments of the salt or the water, and he may, by using the little knowledge that he has, administer a dose to another who has taken poison, and so save a valuable life," he goes on to mention those to whom a knowledge of First Aid principles must be of great value, "Still more emphatically would I insist that every railway man should be certified to render first aid. If, when an occasion occurs, the men at hand, or those that can be sent from the nearest station, know how to stop the flow of blood, to bind up the broken limbs, to improvise a stretcher or a bed, if they know how to carefully lift and carry the wounded to a place of comfort or of safety, or to administer to those in a state of collapse suitable restoratives, then the disaster may be shorn of many of its sorrowful and painful results. I would impress upon all railway companies the urgent necessity of affording their servants opportunities for receiving the necessary instruction to fit them for these duties. It should be a point of honor with them to be able to say that, while every effort is put forth to secure the safety and personal comfort of their customers, they also take care that their employes are qualified to give skilled assistance to them in case of need.

As to the expense of conducting classes. Where an ambulance centre is in existence much of the necessary material may be borrowed from the centre, and if returned undamaged no charge is made, otherwise $5.00 is charged. Such material includes charts, splints, tourniquet, plain and triangular bandages. A stretcher may also occasionally be loaned. Where the lecturer receives a fee it is $25.00 for the course of five lectures. The examiner's fee is $10.00 per examination, also expenses, traveling, including cabs, hotel, etc. In the case of railways, passes are usually granted. Charges for hire of room, fuel, light, attendance, etc., this also is usually free. For incidental expenses the centre makes a charge of $10.00 to classes able to pay, with a reduction of about half to classes of bona fide working-men, these expenses include cost of certificates, printing, postage, stationery, etc. The official text-book is sold here, Toronto, for 40 cents. As will be seen from the accompanying copy of an English circular much of the expense is met by the companies.

Where there is no centre, and it is desired to purchase direct, the following figures may be useful. The class rolls, and much literature of information is supplied free from England.

Physiological diagrams, 15s; registers of attendance and certificates, 6s; case report, 1s; certificates for each of the first ten classes, 10s, 6d; for each subsequent class per year, 7s, 6d; text-books (by post 1d extra) 1s; pocket aide memoire in envelope (postage 1d) 3d; poison card (postage 1d extra), 2d; illustrated Esmarch triangular bandage, 6d; per dozen, 4s, 6s; splints, wooden, per set, 2s, 6d; arm badges, from 9d to 2s; medallions, bronze, 2s, silver 7s, 6d; gold, including name on back, £2, 10s; Furley folding stretcher, ordinary, £2, 2s; small ambulance hamper (alluded to), £1, 11s, 6d; large hamper, £4, 4s.

As a sample of how the English railways look upon the matter of ambulance instruction for their employes I copy a circular verbatim; it is extracted from the report from which I have already quoted so freely.

Copy: (Circular No. 1730.)

Great Western Railway, General Manager's Office, Paddington Station, London, W., 16th November, 1896.

Ambulance Classes in Connection With the St. John Ambulance Association.
(Great Western Railway Centre.)

I have the pleasure of stating that with a view to further encourage the formation of ambulance classes amongst the staff, the directors (subject to certain conditions) have agreed to defray reasonable expenses incurred in the establishment and maintenance of such classes. This will include the provision of articles needed for the working of the classes and the payment of lecturers' and examiners' fees.

Mr. W. H. Maunder, Paddington, will be "Centre Secretary" for organizing the ambulance work throughout the company's system.

1. Members of the company's staff desirous of forming an ambulance class must apply to the centre's secretary, the application to contain not less than twelve signatures of intending members. In the event of a class being approved and established the following regulations will be observed:

(a) A local honorary secretary, who must be approved by the centre secretary, to be chosen from amongst the members forming each class.

(b) The local secretary to send to the cen-

tre's secretary a statement showing the names, occupation, department, and addresses of the members, together with a summary of the arrangements which have been made in connection with the formation of the new class. The secretaries of existing classes to send similar information in respect to such classes, and the advice to the centre secretary must show which members have obtained certificates and what examinations each has passed.

2. Complete sets of appliances will be furnished for each section (formed as per clause 8, of this circular), and be under the charge of sectional storekeepers appointed by the centre secretary. The sectional storekeepers will be responsible for seeing the articles are kept clean and in good condition.

3. The local secretary of a class will apply to the sectional storekeeper three days prior to the date on which a class will be held for whatever appliances are required, and he must see that the whole are returned in proper order to the sectional storekeeper immediately after the lecture or examination has been completed.

4. In order to meet any emergency, keys of the box or room containing the complete sets of appliances will be supplied to the head of each department, the sectional storekeeper, and the local secretary of each class, in the section.

A stock of such articles as bandages, splints, etc., will be kept by the local secretaries, who must record, and be in a position to account for the disposal of such articles, and also order new supplies as required from the sectional storekeeper.

5. The classes may, by arrangement with the head of the department, be held in a station waiting room, or other suitable room belonging to the company, who will also provide writing materials for the use of the members at the examination.

6. The ordinary instruction in the St. John Ambulance work consists of a course of not less than five lectures and practices, followed by examination. Members who have attended at least four lectures, and successfully passed the examiner, will receive a certificate from the St. John Ambulance Association, and also a badge provided free of cost by the company. The examination will be conducted by an examiner of the St. John Ambulance Association.

7. The directors hope that members of classes who have passed the first examination will keep up their knowledge, and perfect themselves in ambulance work by periodical practices, extending over the two following years. At the end of each complete year, from the date of the previous examination, they will be re-examined. Such examination will consist of practical work and questions on the First Aid syllabus of the association; and the result should prove that the knowledge acquired in the first course is not forgotten. The re-examination should be performed by a suitable local medical man, or by the St. John Ambulance examiner if a class is being held.

Members who pass the second and third examinations of the St. John Ambulance course successfully will receive, after the second examination, a voucher, which is supplied gratuitously by the association, and after the third examination, they will be entitled to the medallion of the St. John Ambulance Association, which will be presented by and at the expense of the company.

8. To induce members who have passed the third examination to keep up the knowledge they have gained in the work of the association, the directors have instituted a series of competitions, and will award prizes to the successful competitors.

For this purpose 16 "Sections" will be formed and each class in a section will be entitled to send five members who have passed the three examinations and have been selected by the class lecturer at a class competition.

An annual competition will take place in each section, provided that a suitable number of competitors are available, between: a. Individuals. b. Stretcher parties. And a series of three prizes will be given in each of these competitions, as follows:

For Individual Work.—First prize, £1; second prize, 10s.; third prize, 5s.; total, £1, 15s.

For Stretcher Work (Five Men).—First prize, £2, 10s.; second prize, £1, 5s.; third prize, 15s.; total, £4, 10s.

9. Members attending classes and competitions held at a distance from the station at which they are employed will be allowed passes to and fro, and can obtain them on making application (through their local secretary) to the head of the department in which they are employed, provided their duties can be arranged during their absence. The head of the department will issue the passes.

Passes will be allowed for lecturers and examiners to attend ambulance classes and competitions. Application for the same must be made by the local secretary (through the centre secretary) four days before they are required, in order that applications may be made for them to me.

10. A complete register of all cases of first aid to the injured rendered by members must be kept by each local secretary, and a copy sent to the centre secretary half-yearly in the months of January and July.

11. Any additional information in regard to the formation of classes may be obtained on application to the centre secretary, who

will supply the necessary forms of requisition for certificates, badges, stores, and for preparing statements referred to in clauses 1 and 10 of this circular, and to whom all accounts must be sent to be certified.

12. It is hoped that the assistance afforded by the company towards the objects of the St. John Ambulance Association will encourage members of the staff to attend the classes, which may be established, more especially as the knowledge thereby gained may probably be found useful in their homes and domestic relations as well as in connection with the company's business.

(Signed)

J. L. WILKINSON, General Manager.

Severance of Several Toes—with Restoration.

JOHN COOKE LAURENS, M. D.

During the month of January I received a hurry call to the country, two miles away, to attend a man, Robert T., colored, who had, as the messenger stated, cut his foot "clean off" with an ax while clearing ground. I found on arrival that the condition had been exaggerated, as usual under such circumstances, but the wound was severe enough. The man had been using a heavy ax, and while felling a tree had struck a limb, so that the whole force of the blow was directed to his foot. He cut through the heavy shoe he wore and severed the metatarsal bone of the first toe just through the head and completely disarticulating the toe. The second toe was off entirely just forward of the metatarsal point, and the third was cut and broken, but not off.

Owing to the distance from the house he had to ride horseback more than a mile, and this, with the slowness of the messenger, caused a delay of four hours before I reached him.

The shoe and sock had not been removed and the foot was elevated. I cut the shoe away, with the sock, and found that practically all hæmorrhage had ceased, owing to the clots. When I examined the injury the second toe fell away in my hand and the first toe I discovered to be hanging by a mere string of skin, every muscle and vessel being cut.

As in all cabins, the room was small and ill-suited for hospital purposes, but I at once decided to try the forlorn hope and replace both toes. I washed the site of injury in warm water and found so much dirt, accumulated during the winter, that I was compelled to use the only soap available (some very odorous toilet perparation) to remove it.

No hæmorrhage other than a slight oozing being present, the hot water was quite sufficient to stop it. The toes being quite warm from the mass of clot which filled the shoe, I lost no time in placing them in position and suturing the approximated edges, being careful to insert my needle deep enough to include the tendon on each toe. Interrupted sutures were used, as the foot was very rough and the wound in an awkward place for continuous work.

A dressing of iodoform and boric acid, equal parts, was used, with plain gauze, and the foot bandaged to a splint extending beyond both heel and toes. The iodoform was discontinued after the first day, as it inflamed the part too much, and plain boric acid was substituted.

In spite of the disadvantages of lack of attention, care, etc., I got union by first intention over more than half the injury, and but little pus where granulation took place.

The third day sensibility was present in both toes and in a week he could move them a little on the splint. The stitches were removed on the tenth day and a good recovery was made.

The toes now (July) are strong and movable, sensibility perfect, and save for a litttle tenderness, the man reports his foot as good as ever.

Such a result under adverse circumstances is a little unusual, and for that reason alone I report a not otherwise interesting case.—Louisville Med. Monthly.

In giving chloroform beware of the patients who fight and struggle. They are the ones which furnish most of the mortality.—Int. J. Surg.

Avoid carbolic acid as a dressing in children. Many cases of hæmaturia and other renal complications have attended its employment in the young.—Int. J. Surg.

In injuries of the spine with myelitic symptoms bed sores may occur with startling rapidity. They should be guarded against from the very first.—Int. J. Surg.

In head injuries an artery of the brain may have been injured without bleeding until after reaction has taken place. Many a patient has shown symptoms of cerebral concussion, and apparently rapidly recovered, who has been permitted to get up and has died suddenly a short time afterward. Rest for several days after such injuries should be imperative.—Int. J. Surg.

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A CAUSTIC REVIEW.

We call the attention of our readers to the caustic review (by one of our collaborators) which appears elsewhere in this issue, of a surgical work. It may seem cruel to condemn in toto the literary production of an author, but he who assumes the role of a bookwright exposes himself to criticism.

Surgeons are importuned weekly by canvassers and invited by circulars to add to their already overstocked libraries compendia, monographs, etc., many of which are found to contain no new matter, and many others not even an exhaustive compilation of that which is well known.

It is to be regretted that not more reviewers publish their opinions with the same frankness.

THE BLASTOMYCETIC ORIGIN OF CANCER.

In his report to the American Surgical Association, Park of Buffalo, as chairman of the Committee on Nomenclature and Study of Tumors, states that Buffalo is near the center of an area some 200 miles in radius where the death rate from cancer is larger than in any other part of the United States. He remarks facetiously that it is the residents in that vicinity "who live in the Tropic of Cancer."[1]

There is no doubt but that deaths from cancer are increasing every year. The deaths in the last census year (1890) in the United States were 18,536, and as stated before (Railway Surgeon, IV, 296), the death rate in Chicago has increased enormously.

The principal part of Park's report is devoted to a resumé of the investigations of the Italian school, who believe that cancer is due to blastomycetes or yeast plants. The blastomycete theory is a successor of the coccidium theory, a vegetable parasite being substituted for an animal. It would seem as if the parasitic origin of carcinoma was established, the question is, what is the parasite? The blastomycetæ are already known to be responsible for madura foot and blastomycetic dermatitis, and it would not be improbable if carcinoma were added to the category.

The greater part of the work has been done by MM. Sanfelice and Roncali, and from a late paper of the latter we may gather the principal points of the argument.

According to Roncali, his researches, and those of others, show that foreign bodies are found in the cell protoplasms which are morphologically identical with the blastomycetes. These bodies are to be sought for in the periphery of the tumor and in the juices, but not in the center of the tumor, where growth has stopped and, as in a large tubercular mass, degeneration has begun.

Sanfelice produced tumors in several of the lower animals by injections of blastomycetes, and in one case by injection into the mammary gland of a bitch he succeeded in producing a tumor of the gland with metastases in other organs, which caused death in 14 months.

1. American Jour. Med. Sci. 1898, p.503.
2. Central, f. Bakt. u. Path.

Pittfield Mitchell has called attention to the fact that those organs farthest from the central organ of the nutrient system (the heart) are more prone to tumor formation. As proof of this proposition he cites the relative infrequency of primary tumors of the heart, the pericardium and the lungs, and their common occurrence in the uterus, breast, etc. Possibly the blastomycetic origin of cancer may explain this interesting clinical fact.

Medico-Legal Notes.

Judge and Physician.

Sullivan vs. McGraw, 76 N. W. 149, points a moral, if it does not adorn a tale. This case was an action brought to recover damages from a physician for performing a surgical operation on plaintiff's left leg instead of his right one. Defendant was plaintiff's physician, had treated his right leg and advised an operation. Plaintiff went to a hospital, and under his directions the right leg was prepared for the surgeon's knife. His left leg was partially affected, but had never been treated. After plaintiff had been given chloroform, defendant professionally got plaintiff's legs tangled, protested that the wrong leg had been prepared and ordered the left one prepared and proceeded to operate thereon.

When plaintiff recovered consciousness he told defendant he had operated on the wrong leg and had caused him great pain and suffering. The case was tried before a jury and the trial judge directed the verdict in favor of defendant, on the ground that no negligence was shown attaching to him. The Michigan Supreme Court, taking a different view, held that whether defendant exercised due care was for the jury.

The trial judge's confusion of ideas was not worse confounded than the physician's confusion of legs.

Directing a verdict is generally an operation on the wrong leg.—Chicago Law Journal.

Injured Employe Assumes Risk.

By retaining a portion of the monthly wages of each employe for medical services, the Texas court of civil appeals holds, in the recent case of the S. P. Railway Co. vs. Mauldin, the company obligated itself to furnish such services as were practicable and reasonable to each of its employes when sick or injured. But this duty, the court says, as it understands the evidence here, was to be discharged when practicable by treatment of the patients in the hospital at a certain point, the patients being taken there gratuitously by the company. And this being the case, the court considers it immaterial whether the patient could be properly and successfully treated at another place. When the company furnished there such treatment as the emergency demanded, and was necessary to prepare the patient for transportation to the hospital, by the servants of the company calling to the patient a physician of good reputation residing in the vicinity of the accident, and the patient declined the offer of the company to take him to the hospital, declaring that he was satisfied with the treatment of the local physician, and preferred to remain with him, the court holds that the duty of the company as to the patient was ended, and that he could not recover damages for the mistake of the surgeon to whose care he was temporarily committed, in treating him for sprain and laceration of the muscles instead of for a dislocated hip.—Jour. Am. Med. Association.

Scope of Personal Injury Liability.

When a person is injured through the negligence of another he must use due diligence to secure proper medical treatment, though the Massachusetts supreme court says that his duty in this respect is fully discharged by using ordinary care in procuring a reputable physician, and the same care in following his instructions. That the treatment which he obtains is improper will not release the defendant from liability for negligently causing his injury, nor will the fact that certain medical witnesses testify that blood poisoning is not an ordinary incident if wounds are dressed in a specified manner authorize an instruction that the defendant will not be liable for blood poisoning, unless it is an ordinary effect of such a wound, especially so long as there is no evidence that blood poisoning is not the natural result of such an injury as that which the plaintiff received, and no evidence that the wounds which were inflicted on him were not skillfully and properly treated, and so nothing to call for an instruction to be separately given with reference to disabilities resulting from improper treatment. On the other hand, the court holds correct (McGarrahan vs. N. Y., N. H., and H. R. R. Co.) an instruction that if the plaintiff, in the selection of the physician or surgeon, and in compliance with his directions, was in the exercise of reasonable care, the defendant was still responsible in damages for the results of the injury, although these were more serious than if he had had better treatment. Evidence that one who practices as a physician and surgeon, attends a patient and gives him professional assistance, the court further holds, justifies a finding that the services were rendered for a pecuniary recompense to be paid by the patient. And evidence that a sick person is kept and cared for at a private house, other than his home, the court likewise maintains, justifies a finding that he is there upon expense.—Ibid.

Extracts and Abstracts.

Treatment of Wounds.

By J. E. Summers, Jr., M. D., Omaha, Neb.

Compound wounds of joints are often among the most serious injuries the surgeon is called upon to treat. The seriousness of these traumatisms depends upon two conditions: (1) whether or not the inflicting instrument is free from contamination by inflammation producing germs; (2) the size of the joint injured and the extent of the injury.

Small puncturing instruments, such as shoemakers' awls and the like, when in constant use, are apt to be freer from germs, and punctures into joints made by these instruments are not infrequently followed by mild consequences. Especially is this likely to be so if the instrument does not enter the skin directly over the joint, but at some distance away, or in an oblique fashion. Ice picks, axes and other cutting tools used in cutting, storing and distributing ice often make wounds of joints which, although sometimes ragged and extensive, are aseptic. Most any kind of instrument capable of wounding a joint may produce an aseptic wound, but the presumption is that all wounds into joints, except those made by a careful surgeon, are apt to be followed by infection of the joint. Wounds of small joints are not of much moment as to danger to life, and if the trauma is not great the usefulness of these joints ought to be, in part at least, restored.

Wounds of the joints of the upper extremity which do not seriously damage the component parts of the joint structures are not primarily threatening as to life or future usefulness of the joint, although, of course, the function of the joint may be impaired. It is hardly conceivable nowadays that as a result of such an injury amputation would be called for; rare exceptions will be met. But wounds into the main joints of the lower extremity are sometimes dangerous as to life, and often function is more seriously impaired, amputation being occasionally required to save life. The seriousness of gunshot wounds and compound dislocations and fractures into joints depends in great measure upon the size of the joint and the amount of injury, not only of the component joint structures, but also the extension of the injury to the upper and lower ends of the bones going to form the joint. Greater than all, it must be acknowledged that the future behavior of every compound joint injury depends upon the degree of cleanliness employed at the first dressing.

Symptoms.—The escape of clear or blood-tinged synovial fluid is diagnostic of joint wound, but in some cases of punctured wounds no synovial fluid escapes, and it is practically impossible to say whether or not the joint has been opened. To determine this question it is best to wait for a rapidly supervening secondary symptom of joint puncture, i. e., swelling. The degree of swelling will depend upon the amount of trauma within the joint and the activity of any germs introduced. Slight or no elevation of temperature will mark the absence of infection. A probe should not be used for diagnostic purposes, because, although the instrument be aseptic, in its passage it might force into the joint infectious germs or germ-bearing material which in the passing of the inflicting instrument had been left on the wayside without the joint. In open wounds inspection is often all that is necessary to determine that a joint has been injured. The eye should be aided by the aseptic finger in determining the extent of injury in such cases.

In all kinds of compound wounds of joints which have been infected and brought under observation too late for correct primary treatment, acute septic inflammation follows in the form of abscess within and often without the joint. The joint is swollen, red, hot, and painful. As the flexed position allows of easiest relaxation and accommodation of effused fluids, nature brings it into this position and the patient resists and complains of excruciating pain if any attempt is made to change the position. After the inflammation has lasted a number of days, or perhaps a few weeks, the parts of the joint other than the synovial membrane may be attacked, the cartilages become eroded and the ligaments infiltrated and in part destroyed. The infective process may extend above and below the joint involving the bones, and pus travel along the lines of least resistance between the intermuscular planes. There may be great swelling of the limb due to this cellular inflammation. In moderately extensive compound injuries this extending inflammation may begin early, because the injury opens up the avenues for infection. If the openings, however, happen to be favorably located to favor drainage, the inflammation may remain local until the avenues for discharge become blocked up by accumulating discharges and inflammatory swelling. Spasmodic jerking of the muscles crossing the joint is a symptom of extension of inflammation to the cartilages. This is more marked during sleep, because the patient is "off guard." This jerking causes agonizing pain and patients are apt to awake with a cry denoting great suffering. The septic absorption, pain, and interruption of rest and sleep produce great exhaustion; the pulse becomes fast and compressible; the temperature ranges high, the tongue is dry. Now should nature or art establish good drainage,

all bad symptoms may gradually subside and the patient recover with a more or less damaged and deformed extremity. On the other hand, pyemia may develop, or septicemia and the exhaustive drain cause death.

The approach of these dangerous conditions is marked, in pyemia, by sweating, irregular chills, and elevation of temperature. Such a condition calls for careful subjective and objective examination of all parts of the body. The writer has seen death from pyemia result in less than two weeks after a compound injury to a joint. Exhaustive sweats, emaciation, red cheeks, diarrhea, continued fever of from 1° to 4° F. elevation; increasing frequency and loss of tone of the pulse; too rapid respiration; restlessness, sometimes drowsiness; scanty, high colored, usually albuminous, urine. All these are the forerunners of a fatal termination. They must be recognized early for favorable treatment.

Treatment.—Punctured wounds of joints should be treated upon the antiseptic expectant plan. The skin covering the joint should be thoroughly cleansed with soap, water, and a brush, washed in alcohol and afterwards in a 1-1000 solution of bichloride of mercury in water. An antiseptic dressing is then applied and the joint placed at rest upon a splint. Should the temperature remain down and the evidences of local inflammatory trouble be moderate, nothing more will be required. If, however, the constitutional and local symptoms indicate infection, no time should be lost in making a freer antiseptic incision, or incisions, into the joint. Copious irrigation (bichloride 1-3,000) should be employed in such a way as to reach every recess of the joint. Drainage tubes should now be introduced and the limb enveloped in heavy moist antiseptic dressings.

The joint should be placed at rest upon splints and elevated, perhaps using the weight and pulley in order to prevent irritation of joint surfaces by muscular spasm. The local application of cold by packing in ice is of great value in controlling inflammation. The cold does no injury and undoubtedly inhibits germ activity. To be of service it should be applied around the antiseptically dressed joint in much the same way as ice is packed around the can of an ice-cream freezer. The Leiter coil and similar appliances are tinkering tools in such cases. Continuous antiseptic irrigation with ice cold fluid is often of great value. In extensive injury use the same plan of treatment, that is, painstaking antisepsis, irrigation and drainage, antiseptic dressings. Amputation should never be thought of in civil practice unless the vessels, nerves, and tendons crossing the joint are so damaged that repair with usefulness is out of the question. Atypical or even typical resections may be done. It used to be thought that primary amputation was required in gunshot and other lacerating and destructive joint injuries. Since expectant antiseptic drainage with immobilization, practiced first by Langenbeck and other German surgeons during the war with France, have given most satisfactory results, the surgeon of to-day would hardly be justified in amputating as a primary procedure. If in infected joints the line of treatment indicated does not succeed,—and it may succeed even after wide suppuration, if only the drainage through all infected tissues be made ample and maintained until repair is well established; —then amputation ought to be considered and not too long delayed. Pyemia may be checked by extensive incisions into and above and below the primary focus. Secondary collections must be opened and drained early. Amputation may be done, but if at all, it must be done after secondary foci have been detected and drained, and the incisions into and around the joints have proven insufficient to check infection. When hectic threatens destruction by exhaustion, amputation is imperative. The patient should be freely stimulated by strychnia and alcohol and a rapid operation performed under as short and not too profound anæsthesia as possible. The main vessel should be tied and oozing prevented by proper sponge packing and bandaging. Few or no stitches ought to be introduced. If the shock of the operation is sustained, recovery is usually assured. The writer has been surprised how wonderfully recovery has followed among the apparently hopeless cases of septicemia of the kind under consideration which have been treated by amputation at his hands.

Heart stimulants, alcohol, easily assimilated, perhaps predigested food, should be given, sponging of the surface, copious draughts of water, all aid in carrying the treatment of these cases to a successful termination. The employment of antistreptococcus serum would be useless in chronic cases, but might possibly be an advantage in the early periods of acute infection; but here, as elsewhere, treatment should be directed towards prevention and limitation by removal of the cause of infection.—West. Med. Rev.

Surgical Dressing in General Practice.

By P. H. O'Hara, M. D., of Pottsville, Pa.

When so much is written, almost every week in the year, on the subject to which I am about to refer, we cannot do otherwise than hesitate before either talking or writing about anything we read and hear so much about and which is so regularly discussed in our journals, and also in our medical meetings. Inasmuch as we are called upon, daily, to at-

tend to some surgical case of small or great importance, we are continually on the qui vive as regards the perfection of our antisepsis. In vain do we ask ourselves, have we succeeded in perfecting our dressings or how much advancement have we made in that direction? We know of the difficulties which beset the general practitioner in his field of operations and we know of that field being a very large one. We also know how utterly impossible it is for us, in many instances, to even expect a fair recovery in cases with which we come in contact in our daily work—the nature of the injury, the manner of its occurrence, and the immediate after-condition upon which so much depends, as to whether the wound is or is not infected and to what extent. This is the point which attracts our greatest attention and our greatest regret when we are called to attend a wound that has been poisoned by the entrance of some of the microbic family.

It is at this time that the greatest harm is done—from the time of the reception of the injury to the time when the patient is brought under the immediate care and attention of the man who is to be responsible for the future welfare of the patient.

Time and again we all regret the very trifling care and attention given to many of our current cases of surgery in the beginning of treatment. Of course the occupations of our surgical patients, as a rule, are such as to almost preclude the possibility of any degree of cleanliness, not to speak of an attempt to temporarily dress the wounds of the patient in an antiseptic manner. The class of patients also must be considered. The degree of cleanliness to which they are accustomed, also their very impoverished manner of living, has its effect on these patients.

Considering our patients, their occupation, their surroundings, and their own ordinary knowledge—very ordinary in the majority of cases—we ask ourselves the question: Is there no way to improve the condition of affairs, as they exist at the present? We can answer the question very conclusively, no. And the result will be this, that the same conditions of our patients which has existed shall continue. Our only method is to endeavor to improve our dressings to counteract the influences that tend to give us much trouble in the treatment of these surgical cases. We might also ask the question: What constitute the best surgical dressings? If the question were to be asked of every member present, almost every person would advance his own reagents with his particular strength of preparation as the best. Can we dispute with him this or that point, pro or con, as to its efficiency? No, we cannot. We all know of and agree with that most important process, namely, sterilization of all agents and appliances used in a surgical operation. Then agreeing upon this—the salient feature in all our surgery—what matter is it if we do vary in this or that manner from the way in which he uses his favorite antiseptic agent? Sterilization is the method, par excellence, that does for us in surgery more than any other agent resorted to, to aid us in performing a perfectly pure and clean operation. If sterilization does so much for us, then the question may be asked, why is not that sufficient without the aid of chemical agents? We all know that even though sterilization is so beneficial, it is not sufficient, and for that reason we resort to the use of the various antiseptic agents, which, when used in conjunction with sterilized solutions, render more possible the result which we endeavor to obtain. The question arises, which antiseptic agent is the best to use? The answer varies with the different persons called upon to answer the question.

Every man uses that remedy in medicine which has given him the most beneficial results the greatest number of times; so it is in the answering of this question in surgery. We use that agent which has proved the best in our hands.

Before referring directly to our subject, we might ask ourselves the question: Do we always perform our duty as thoroughly as we should, upon our first call to see an emergency case? Furthermore, we may also ask how many of us are sufficiently equipped to answer a call to an emergency case? I have reference to the contents of the surgeon's grip. How wofully lacking it is on many occasions, and how serious are the results from such oversight on our part. We all know of cases which have suffered as a consequence, in one way or another, from our neglect; the extent of such suffering and loss of bodily strength might have been greatly lessened were we better prepared. There is certainly fitting excuse at certain times and in certain cases, but, on the whole, we are not careful enough. Even though a case comes under our care for a short time until the patient or friends decide whether it is to be a hospital case or not, we should do our best for the patient in the way of dressings, and the application of temporary splints, if necessary, to ease the patient on his way to the hospital, thereby lessening the degree of shock to which nearly all these patients are subjected.

How very urgent it is in such cases for us to be more careful, is only too well known to require any further comment. Suffice it to say the giving of a hypodermic either to ease the pain or to stimulate a sinking patient, or to dust the wound or wounds with any of the powders used, and then to protect by the

use of a temporary bandage or other necessary dressing.

This is a most fitting time to use the remedy I wish to speak of to-day, both on account of its ease of preparation and the benefit derived from its employment.

The salt can be most conveniently carried in a small vial, occupying one of the portions of the case, and can be prepared almost anywhere.

Potassium permanganate is one of the most useful, and, at the same time, one of the best antiseptic agents in use to-day in modern surgery. Its use is not a new thing. It has been used for years; but, during the last several years, greater attention has been given to its many uses in surgical practice than in the past. There is no other agent of its class that can be used so universally in the general practice of medicine and surgery as can potassium permanganate. Either as a temporary or permanent dressing it serves well. It can be used in almost any operation upon any part of the body. It is speedily prepared at any time and at almost any place. While serving in the capacity of much more powerful antiseptic agents, its use brings about the same equally good results without any possibility of danger to the person or detriment to the tissues acted upon surgically. In this respect it supersedes the same use made of other antiseptics, both as concerns the local effect and also the systematic effect sometimes caused by other drugs upon the system. To speak of the local effect of antiseptics, we all know only too well of their injurious effect upon the tissues, when used in great strengths. Delayed unions and tardy recovery from injuries sustained have been directly traceable sometimes to the too strong use of antiseptics. Happily at the present time we rarely, if ever, resort to the use of such strong solutions of mercury and carbolic acid as was customary in the early days of antiseptic surgery. The strong solutions have had their day. It was the extensive use of them, to a great extent, that prompted the researches that were made in the process of complete sterilization, and from which we derive the greatest benefit in our work of to-day. Truthfully speaking, we must admit that we owe much more to the sterilization for our success in the past years than we do to the uses of the powerful drugs in the strong solutions, to which we were accustomed. The process has been brought up to such a degree of perfection that major operations are being performed without the aid of any of the antiseptic powders or dressings save the sterilized ones.

The principal object of these few remarks is to invite your attention to the use of potassium permanganate as it is being used to-day by many of the surgeons of the country. Those men using it almost daily in their work speak very well of it. A great point in its favor, though it be not a "perfect" remedy of its kind, is the fact that the results following its use merits its continuance in practice. The permanganate is no new thing, as I said before; for, on the other hand, it is a very old remedy. It has stood the test through years of practice. Its use wears well. The longer we use it the better we like it, and it is surprising, in some instances, that it is not used more extensively. We know surgeons who have used it for the past twenty-five years and who are still using it to-day. Potassium permanganate is a salt prepared by heating together ten parts of manganese dioxid and twelve parts of potassium hydrate. It occurs in slender prismatic crystals of a dark purple color, inodorous, of a sweetish, disagreeable taste, and is very soluble in water, with which they form a solution varying from a purplish black to a reddish color, varying according to the strength. When kept dry and not exposed to the atmosphere, the potassium permanganate is a permanent salt, but when in solution it is brought into contact with an organic body, it at once gives up its oxygen to the latter and is converted into potassium hydrate and the black oxid of manganese.

The power of this salt to disinfect wounds is beyond question. The most vigorous opponents to its use in surgery freely admit this fact upon the frequently renewed application of the solution. The reason that frequent applications of the solution are requisite in putrid cases, is owing to the fact that the salt gives up its own oxygen, thereby becoming inert.

The germicidal power of this salt has long ago been discovered and frequently verified. According to the Medical News and other medical records, experiments are frequently cited as authentic reports proving its value as an antiseptic.

Dr. George Sternberg, who has spent considerable time in this research, has found that the permanganate as a germicide is a very potent agent, 0.12 per cent or one part in 833 parts killing the micrococci of pus in two hours. Excess of organic material, as a rule, interferes, when present, in the destruction of these germs, requiring renewal of solutions to counteract the influence of these tissues. When this action takes place the solution becomes discolored to a greater or less extent, such a result showing it to be the proper time to renew the solution. Despite this fact, the permanganate affords a very efficient antiseptic solution for douching of infected cavities and wounds, and ulcers of recent or long standing. In operating upon acute or chronic abscesses the thorough application of the per-

manganate solution purifies the offensive wound at once and at the close of the curetting, if such be necessary, we have seen the most prompt recovery take place without the aid of any other antiseptic agent.

We have seen the permanganate solution used in operations upon almost every part of the body. With reference to injuries of the scalp, I can speak of it in very good terms, The case I bring before your notice to-day is one of the few recoveries from such an extensive destruction of the scalp that is met with in ordinary practice. The boy's scalp was torn completely from his head by the bites of a vicious bulldog. So thoroughly was it removed that the periosteum was destroyed over a surface of eight square inches. Besides this denudation of tissue the cartilage of the right ear was bared on both sides, the forehead being so lacerated as to require a dozen or more sutures. Taking the case as a whole, it was a ghastly looking sight. The dressing in this case was the simple permanganate solution continued over a period of weeks with good results. In further favor of this solution, let me add that there were four cases of erysipelas in the hospital at the same time that this child was an inmate. I have seen on other occasions this same condition of affairs as regards the apparent immunity of wounds from erysipelatous infection when being dressed with the permanganate solution.

The second case I bring before your notice is a recovery from a compound comminuted fracture of the skull. In reply to certain questions about the use of permanganate upon the members of the brain, let me say that both the pia mater and dura mater were lacerated, with a slight extrusion of cerebral substance. All of the tissues were subject to this solution. It was the only antiseptic agent used during the operation save a slight dusting with aristol at the points of exit of the drainage tube. The tube was taken out on the third day. The patient had but one rise of temperature during the stay in the hospital, the rise occurring four hours after the operation, and was then only 100 degrees F.

The third case was a most important one as regards the cleanliness of the wound. The case was one in which there was excessive loss of blood, partial mutilation of some of the bone and quite extensive tearing of the muscles and tendons of the arm. The extensor carpi ulnaris, extensor minimi digiti, flexor carpi ulnaris, flexor profundus digitorum, and the lower portion of the ulnar bone extending into the side of the wrist-joint were striped of overlying tissues into bone tissue. This patient endured other complications, but in spite of a very low physical condition, succeeded in going on to recovery and saving his arm, or at least what was left of it. In this case, as in the preceding ones, we used the permanganate solution with an occasional dusting of aristol.

Special reference may be made of this solution in the Estlander operation and the many subsequent dressings necessary. The most agreeable results followed its use in nearly every one of these cases.

In operations in the abdominal cavity there is the greatest satisfaction in using it, and very liberally too. I have never seen a septic condition following its use. On the other hand many believe it to be valuable in abdominal surgery. In all abdominal work we use it exclusively. The same may be said of it when used in operations upon the cervix uteri and along the parturient tract.

As regards the treatment of leg ulcers, this remedy stands above all other remedies, wherever a cure can be reasonably expected. The above cases have been acted upon by the salt in solution. In the dry form, when applied to sloughing ulcers, it is of very much service. As to the strength of the solutions used, it varies from the weak solutions used in specific cases of one or two grains to the ounce to 60 grains to the ounce, depending upon the class of cases upon which it is used. Having seen this remedy used almost daily during the past six years, and having had the opportunity to observe the results of its application in no small variety of cases, I feel at ease in recommending its use more generally, knowing at the same time that nothing but good satisfaction will be the result of our more thorough acquaintance with this remedy.—Lehigh Val. Med. Mag.

Displacement of the Bladder Caused by a Railroad Accident—Corrected by Laparotomy.

By F. L. Forker, M. D., Binghampton, N. Y.

The case I report to-day is, as far as I am able to ascertain, unique, for a faithful inquiry and diligent search of medical literature have failed to elicit the fact that such a case has ever before been reported. That the bladder could be displaced upward to within one inch of the umbilicus and firmly held in that position for over one year does not seem credible, but the history I am about to give you will, I am quite sure, convince you that such has been the case.

November 15, 1897, I was called to see Mrs. G. P——, who gave the following history: The patient, aged thirty years, had enjoyed good health until October 10, 1896, when she was thrown from a carriage upon a railroad track, striking her back across the

rail, and a woman weighing over two hundred pounds fell upon her, striking with her knees over the lower part of the patient's abdomen. This accident rendered her unconscious for two hours, after which she was placed in a carriage and driven fifteen miles to her home. Excessive flowing from the vagina took place during the journey homeward, but soon ceased after she was placed in bed. The next morning she noticed her abdomen to be nearly as large as a full-term pregnancy and very firm, and the slightest motion or jar would cause her severe pain. But after two weeks' rest in bed the pain and soreness diminished some and she assumed her household duties again. Painful urination and shooting pains through the pelvis, especially in the back, were the only symptoms complained of until March, 1897, when an excessive diarrhœa set in; the stools were very black and very fetid. Some days as many as twelve stools were passed, with a pint or more of thin, black, fetid discharge in each. In spite of cathartics and various other remedies prescribed to stop this diarrhœa, it continued for one month and then ceased of its own accord. Severe chills and fever followed and the patient was again compelled to take to her bed. About the middle of April a second diarrhœa set in, but this one was described to be different from the first; the stools presented a light appearance, and the woman's physician assigned typhoid as the cause. Her condition then improved, and after a few weeks she was advised to go to the country. But she was no sooner there than her fever and chills returned and she was compelled to come home again. This condition continued from April to the date of my visit, November, 1897, at which time she complained principally of her bladder. She said that from the time her abdomen began to diminish in size, which was at the beginning of her diarrhœa in March, this difficulty in voiding urine had constantly increased, until it was so severe that she was compelled to resort to morphine for relief. At that time in order to void urine it was necessary to take a deep breath and bear down as she would in childbirth, and as soon as she stopped bearing down the urine would stop flowing. After she had expelled all the urine possible from her bladder there would still remain a sensation of more being present, so she had a constant desire to urinate. She was also troubled with a dragging pain in the center of the abdomen after voiding urine. This would vary according to the amount passed. When a large amount was passed it would be so severe that she would have to take an opiate for relief. As the abdominal walls were very thick and firm, examination was unsatisfactory, the only fact elicited thereby being that there were in the urethra no obstructions to the outflow of urine and that the pelvic contents were firmly fixed by a mass of adhesions. She was taking morphine steadily; her bowels were constipated, the urine was heavily loaded with mucus and phosphates, and she was in an extreme lithæmic condition. Consequently I ordered the morphine stopped, rest in bed, milk diet, lithia, saline cathartics and hot applications over the abdomen for relief of the pain.

After this plan of treatment had been carried out faithfully for two weeks and my patient's discomfort instead of diminishing had continued to increase. I advised an operation as the only hope of relief. This advice being accepted, December 1, 1897, at the City Hospital, after the usual preliminaries and with the assistance of Drs. Farnham, Quackenbush and Seymour, laparotomy was performed. The abdomen being opened, the bladder was found displaced upward, between the peritoneum and abdominal walls, to within one inch of the umbilicus, and firmly adherent to the abdominal parietes in front and to the peritoneum over the summit, sides and posterior surface. The bladder was elongated and suspended in such a manner that it was impossible for it to empty itself, and, although the patient voided urine at the beginning of the anæsthesia, after the adhesions were separated over one pint was drawn off with the catheter. The pelvic organs were massed together by firm adhesions, some of which around the fundus of the uterus were separated, after which the operation was completed in the usual manner. The progress made by my patient after the operation was very satisfactory up to the middle of the fifth day, when, following a severe chill, her temperature rose in six hours from 99 degrees to 103 degrees F., pulse from 88 to 155, and trouble seemed to be at hand. But the administration of a laxative caused the passing of three fetid stools, after which the temperature and pulse gradually returned to normal and she made an uneventful recovery. During the first two weeks after the operation there was some burning sensation during the passage of urine, but that has now entirely disappeared and her bladder acts in a normal manner.

The history I have given describes the natural course taken by a large pelvic hæmatocele which has been evacuated by perforation into the rectum. The most interesting points in the case are the spontaneous evacuation of the large hæmatocele without causing death and the displaced position the bladder was left in. Perforation into the rectum may be followed by death from exhaustion or from infection caused by entrance of fæcal matter.

The only way I am able to explain this dis-

placement of the bladder is that this large hæmatocele, by pressing upon the urethra, formed an obstruction to the outflow of urine, and as a result the bladder became overdistended, the summit rising up to the umbilicus, and it being held in that position for some time, the accompanying peritonitis caused the adhesions which held the bladder suspended, when in March, five months later, the obstruction was removed by spontaneous evacuation of the hæmatocele. Operation in this case has been followed by the most happy results. In fact, it has saved my patient from the morphine habit, and changed her condition from one of intense suffering to one of comfort.—Med. Record.

Notes of Societies.

"Big 4" Railway Surgeons.

The following is the programme for the meeting at Cincinnati, November 10:

"The Diagnosis and Treatment of Lumbago and Back Sprain," J. Schneck, Mt. Carmel, Ill.

"The Surgical Consideration of Shock and Its Treatment," A. Rhu, Marion, Ohio.

"The Value of the Hot Water Bath in Surgery," T. P. Satterwhite, Louisville.

President's Address, L. E. Russell, Springfield, Ohio.

"The Best Method of Examining the Eyes and Ears of Applicants for Admission to the Railway Service," C. W. Tungeman, Cincinnati, Ohio.

"The Care of Head Injuries," by Webb J. Kelly, Galion, Ohio.

"A Case of Brain Injury," by T. J. Whitton, Nokomis, Ill.

"The Railway Surgeon and the Company," Geo. M. Waters, Columbus, Ohio.

"Hæmorrhoids and Their Treatment in Railroad Employes," T. M. Kyle, Aurora, Ind.

"Anæsthetics—How to Minimize the Danger of Their Use," E. H. Hyatt, Delaware, Ohio.

Surgeons Pennsylvania Co.

At the recent meeting in Cleveland the following papers were read: "Malpractice," G. W. Thompson, Winamac, Ind.; "Traumatic Tetanus," George W. Burke, New Castle, Ind.; "Traumatic Sarcoma of the Scalp," J. H. Wilson, Plymouth, Ind.; Paper, John R. Pipes, Cleveland; "Some Observations in the Treatment of Injuries," A. J. Banker, Columbus, Ind.; "A Contribution to the Surgery of the Vermiform Appendix," with report of forty cases, Frank LeMoyne Hupp, Wheeling; "Report of Case (Fracture of Femur Involving Knee-Joint)," J. B. Vail, Lima; "The Sustaining Powers of the Kola Nut," H. H. Yergun, Union City, Ind.; "Injuries of the Muscular System and Treatment," D. L. Phipps, Whiteland, Ind.; "Treatment of Wounds," E. C. Loehr, Noblesville, Ind.; Paper, Parker, Cleveland; Paper, C. E. Brush, Zanesville; "Report of Case," Mart Linville, New Castle, Pa.; "The Voluntary Relief," Dr. Arnold, chief medical examiner, Cleveland; Paper, George C. Stemen, Fort Wayne.

The following are the officers for the ensuing year: President, Dr. Joseph H. Hobson of Cleveland; secretary and treasurer, Dr. George C. Stemen, Fort Wayne, Ind.; first vice-president, Dr. J. S. Hunt, Chicago; second vice-president, Dr. D. H. Lewis, Washington, Pa.

C., M. & St. P. Ry. Surgical Association.

The sixth annual meeting will be held at Great Northern Hotel, Thursday and Friday, November 17 and 18, 1898, beginning at 10 a. m. The following papers have been promised:

"Relation of Injury to Death from Pneumonia," W. T. Sarles, Sparta, Wis.

"Cases of Tetanus," O. E. Plumbe, Rock Valley, Ia.

"The Treatment of Fractures without Immobilization," W. S. Caldwell, Freeport, Ill.

"Pott's Fracture with Complications," J. E. Luce, Chilton, Wis.

"Surgical Shock," T. W. Nuzum, Brodhead, Wis.

"The X-Ray," G. G. White, Elkader, Ia.

"Traumatisms of the Foot," A. W. Law, Madison, Wis.

"Traumatic Injuries to the Abdominal Viscera," J. N. Warren, Sioux City, Ia.

"Two Cases of Traumatic Surgery," Ira K. Gardner, New Hampton, Ia.

"Traumatisms of the Eye Involving the Lens, with Report of Cases," C. D. Westcott, Chicago, Ill.

"Experts et al," D. A. Stewart, Winona, Minn.

"Primary and Multiple Amputations," H. H. Clark, McGregor, Ia.

"Asphyxia Caused by Drowning," H. K. Whitford, Elgin, Ill.

"First Aid to Injured, Control of Hæmorrhage, etc.," J. H. Thornton, Lansing, Ia.

There is room for a few more good, crisp papers and reports of cases.

Requests for transportation should be made before Nov. 10, 1898, to the undersigned (and not to the special agent).

A. I. BOUFFLEUR, Secy.,
1008 Fisher Bldg., Chicago.

Notices and Reviews.

Deformities. A Text-book on Orthopædic Surgery. By Edward J. Farnum, M. D., Cincinnati, and Edwin Younkin, M. D., St. Louis. Profusely illustrated. Chicago, Medical Press Co., pp. 544. $5.00.

The authors of this volume must have yielded to an "irresistible impulse" in producing it.

Its title, "Deformities," which we are told on page 21, Dunglison defines "a morbid alteration in the form of some part of the body," has served as a drag net of such extensive reach that Andry, as he views it from his celestial seat, cannot but be pleased with the variety of things surgical which have been caught in it. Should the qualifying sentence, "a text-book on orthopædic surgery," appear to limit its scope, the reader is informed in Chapter II, on Definitions and Classification, that "orthopædic surgery treats of the causes, prevention and correction of deformities in the human body."

These are some of the subjects, "systematically arranged," in this latest text-book on orthopædic surgery: Giants, dwarfs, monsters, congenital tumors, spina bifida, harelip, imperforate anus, congenital syphilis, Potts' disease, sprains, chronic rheumatic arthritis, Charcots' disease, paralysis, progressive muscular atrophy, hammer toe, hernia, etc., etc., to the consideration of each of which one or more chapters are devoted.

We agree, indeed, with the authors that "the book comprises many subjects not ordinarily included in works on orthopædic surgery." Teratology and orthopædics are distinct departments. It must be admitted that practically orthopædics embraces more than the correction by "mechanical means" of the deviations in position and form of the skeleton. Orthopædic surgery is, perhaps, the better term by which to designate the means employed to correct deviations from the normal in osseous structures. But how does orthopædic surgery concerns itself with hernia? So much for the title and scope.

The manner of treating the various subjects can be approved neither as to delineation of the pathology, the symptomatology, nor so far as the treatment is concerned. Take as an illustration such common affections as those involving the knee-joint; no distinction is made between arthritis following injury, hæmarthros and a purulent effusion; the symptomatology is incomplete and the treatment is limited to measures instituted to meet in part the indications following knee-joint affections rather than the affections themselves, and yet we are led to infer that a thorough treatise on knee-joint disease is offered.

It is not intended to point out in this review the numerous sins of omission and commission contaned in this volume, but we cannot refrain from calling attention to the pernicious teachings in the very incomplete chapters on hernia. "The senior classes in medical colleges" and the "practitioners, whose experience in deformities has been limited," whom this book is intended to assist, will greatly increase the danger which besets their patients who are suffering from stangulated hernia, if their knowledge of this most perilous surgical affection is limited to the information furnished by this pretentious text-book.

Many of the illustrations, especially those borrowed from other authors, to whom credit is not given, are good; others, for example, the photographs of one of the authors and his assistants, might be considered as representative of the scientific value of the work. The absence of aseptic precautions on the part of the chloroformist is typical of the lack of thoroughness which is discernible on every page.

Neither the printer nor the binder can consider their work of the highest order.

This book should not be in the hands of any student nor on the shelf of any practitioner.

One of the century end necessities may be a press censor of surgical literature, if publishers continue to issue such volumes.

LUTZ.

"An American Text-book of the Diseases of Children, including special chapters on Essential Surgical Subjects, Orthopædics, Diseases of the Eye, Ear, Nose and Throat; Diseases of the Skin, and on the Diet, Hygiene and General Management of Children. By American Teachers. Edited by Louis Starr, M. D., assisted by Thompson S. Westcott, M. D. Second Edition revised. Philadelphia: W. B. Saunders, Chicago: W. T. Keener, 1898. pp. xvi-1244. Price $7 net.

The second edition of this book has been extensively revised, new articles have been added, some have been rewritten and brought

up to date. There are sixty-five contributors, most of whose names are familiar as specialists in the department of medicine with which the book deals. In the preface to this edition the editor expresses the hope that he may be able to round into a more perfect treatise the work of the various authors, but there still remains an unevenness in style and matter which seems to be characteristic of books of this class. Many of the articles, however, are high class and of great value. An article on modified milk and percentage milk mixtures is added, the subject is treated shortly and concisely, though it must be observed that the treatment of the entire subject of infant feeding is disjointed and lacks detailed and definite information, such as would be expected in a volume of this kind.

The article on Lithemia, by Rachford, is a valuable addition to the work and contains the author's well-known views and researches on this very important subject.

The article on Diphtheria can hardly be said to be up to date; an attempt has been made to revise it, though the description of the symptomatology and course of the disease lacks in fullness. The antitoxin treatment is discussed in the wrong place in the text. Owing to its importance it should precede internal and local treatment. No mention is made of the source of antitoxin, its method of manufacture, nor are any directions given for its administration. This seems a serious omission as statements of this kind are expected to be found in standard text-books.

A chapter is devoted to orthopædics, in which the subpect is treated in a very satisfactory manner. It is presented very fully and with many instructive illustrations.

The work of the publisher, as usual, is beyond criticism.

ISAAC A. ABT.

PAMPHLETS RECEIVED.

"Sleeplessness; Its Cause and Treatment," by Elmore S. Pettyjohn, M. D., of Alma, Mich.

"The Aseptic Animal Ligature; Its Place in Surgery," by Henry O. Marcy of Boston, Mass.

"An Additional Case of Double Microphthalmos; What Should the General Practitioner Know About the Eye?" by Cassius D. Wescott, M. D., of Chicago.

Railway Miscellany.

President Burt of the Union Pacific has issued an order closing all saloons in connection with eating-houses along the line.

One of the passenger trains of the Louisville & Nashville road is equipped with an electrical station annunciator, which displays a sign bearing the name of the next station. The brakeman presses the button.

The Canadian Pacific has completed the stringing of its new trancontinental copper telegraph wire from Montreal to Vancouver, a distance of 2,900 miles, and the first message was sent over it September 20.

During the month of July the relief department of the Baltimore disbursed $31,411.17 in benefits in 1,459 cases, 21 of which were deaths. This brings the total amount paid in benefits since May 1, 1880, up to $5,137,018.49.

A San Francisco dispatch states that the California railroad commissioners have decided to undertake an investigation of the Pullman Palace Car Company with a view to determining whether the rates charged by the company can be legally reduced.

The Cleveland, Cincinnati, Chicago & St. Louis Railroad have adopted a list of rules and regulations on the cleaning and sanitation of passenger cars that are favorably commented upon by the State Board of Health of Indiana, and are approved by the traveling public.

With the purchase the Erie & Huron Railroad by the Lake Erie & Detroit River, the scheme of establishing a car ferry across Lake Erie, from Rondeau, Ont., to Cleveland, is revived. The undertaking involves the construction of a car ferry which will carry loaded cars across the lake, a distance of 55 miles. Such a scheme was proposed a number of years ago, but never carried out.

The Southern Railway is taking steps to provide pure drinking water for its passengers by the erection of a large filter at Danville, Va., from which all passenger trains passing that point will be supplied. It is to be constructed underneath the tank from which the engines are supplied, but its supply will be from the city pipes and not from the railroad source of supply.

Some very fast running is scheduled in a new time card of the London and Northwestern road in England. Two trains are booked to run between London and Liverpool, 201 miles, at an average speed of 51.8 miles an hour; five trains between London and Crewe, a distance of 158 miles, at 51.6 miles an hour; two trains between Carlisle and Crewe, 141

miles, at 52.9 miles an hour; two trains between Wigan and Carlisle at 52.6 miles an hour, and two trains between Willesden and Sheffield at 52.2 miles an hour.

The Montreal and Ottawa line of the Canadian Pacific is now ready for operation and was to be formally opened on September 4. The road has been completed from Montreal to Rigaud for several years and was extended in 1896 and 1897 from the latter point to Ottawa. It is 110 miles long and is built on practically a direct line, with a maximum grade of eight-tenths of one per cent, effecting a saving of 11 miles over the old route of the Canadian Pacific between those points. It will be used principally for passenger service.

The Pennsylvania Railroad now uses a new kind of track torpedo. With the old style considerable of trouble has been had at times of wrecks or collisions to know just where torpedoes had been placed upon the track. The new torpedo is in the shape of a little tin box, with wire clamps to fasten it to the rail; underneath are two little circles of some red paste preparation, which, when the torpedo explodes, leaves a bright red stain on the rail, enabling the officials to determine the exact location.

Railway officials will be interested in a decision rendered by the court at Syracuse, N. Y., in a suit against the New York, Ontario & Western, to compel it to issue a 1,000-mile ticket, in accordance with a recent state law. The road refused to sell the plaintiff a mileage book unless he signed an agreement to the effect that the book should be forfeited if presented by any other person than the one whose name appeared thereon. The court held that the road had no right to impose such a condition and that it was in violation of the law. The plaintiff was awarded damages of $50 in each of two cases.

The investigation of the cause of the fall of the piers and foundations of the New York & Ottawa bridge at Cornwall, Ont., on behalf of the Canadian government, has been begun the present week. The removal of the wrecked spans has been a matter of a considerable amount of study, and engineers do not agree as to the best methods by which it is to be accomplished. The contracts will be let shortly. Mr. George E. Thomas, engineer of the Sooysmith work, has been preparing to clear off the debris from the old pier, and to rebuild it. He will probably begin work very shortly, it being the intention to lose no time in completing the bridge.

It is interesting to notice that "with the possession of the Washington Central Railway" (acquired on March 1, 1898), "there was restored to the system of railway west of St. Paul and Lake Superior all of the mileage comprised in the old Northern Pacific system prior to the receivership of 1893." The history of the Northern Pacific has been full of dramatic incidents, but none more dramatic than those which have occurred since 1893. The road is now whole again—whole, that is, so far as its legitimate territory is concerned—and at last it is being given the chance, magnificent property that it is, to show what it can do. It is showing it, and, to quote Mr. Mellen's words, "the way in which officials and employes have intelligently coöperated to produce these results is worthy of the highest praise."

They have a commendable way of dealing with ticket scalpers in New Jersey. At the instance of the Pennsylvania Railroad a scalper named Murray was arrested at Atlantic City early in August on a charge of illegally selling railroad tickets, and he was committed to jail in default of $800 bail. He was subsequently indicted on four distinct charges, and upon being brought into court for trial September 23, unexpectedly pleaded guilty. He was sentenced under one indictment to sixty days' imprisonment and was fined $20 and costs. In addition he promised to leave the state and never to engage in ticket scalping again. Upon the other hand, the ticket scalper of the West receives encouragement from the decision of an Ohio court pronouncing unconstitutional the anti-ticket scalping law recently passed at Cincinnati, and from the opinion of Chicago's corporation counsel, to the effect that the city's charter does not give the council power to restrict traffic in railroad tickets.

A statement to the effect that the Saugus branch of the Boston & Maine is to be equipped with electricity is denied by President Tuttle, who, according to the Boston Herald, says that such a thing is impossible, because no electric system is known which could be applied to any part of the Boston & Maine system connected with the union station in Boston. The electric equipment of the station in lighting, switching, signals, etc., would be hopelessly deranged and demoralized by the introduction of any third-rail device. Mr. Tuttle is of the opinion that the steam roads cannot successfully introduce electricity for their suburban traffic, but they will be compelled to surrender a share of the business to the electric lines, which by their location in the streets have an advantage in convenience for passengers. The "trolley road zone" cannot be changed. Instead, the steam roads must develop their longer distance service, and in a zone between 6 and 25 miles from the city is their opportunity. Low fares, light trains and frequent service will give them business which the trolley lines cannot absorb.

There appears to be some foundation for the

statement that a movement is on foot to secure a new through line from the Louisville & Nashville at Big Stone Gap, Va., to Wilmington and Southport, N. C., by combining several existing roads and building connecting links. The line could easily be made up as follows: South Atlantic & Ohio, Big Stone Gap to Bristol, Tenn., 66 miles; Bristol, Elizabethton & North Carolina, Bristol to Elizabethton, Tenn., 22 miles; Eastern Tennessee & Western Carolina, Elizabethton, Tenn., to Cranberry, N. C., 24 miles; gap of about 30 miles from Cranberry to Collettsville, N. C., of which 13 miles have been graded by the Linville River Railroad company; Caldwell & Northern, Collettsville to Lenoir, N. C., 11 miles; Carolina & Northwestern, Lenoir to Lincolnton, N. C., 47 miles; Seaboard Air Line, Lincolnton to Wilmington, 218 miles; Carolina, Tennessee & Ohio, partially graded in 1896 from Wilmington to Southport, 30 miles. This would give a line 448 miles long, from Big Stone Gap to Southport, where there is a deep-water harbor, and the through route could be secured by building only about sixty miles of road, over one-half of which is already graded.

Northern Pacific.

When it was first announced that the annual report of the Northern Pacific would show that the road had been operated for 46.9 per cent of the gross earnings, the statement was received in many quarters with outspoken incredulity. When the report itself appeared in full, however, these criticisms were silenced. Gross earnings were $23,679,718. The operating expenses, which represent the 46.9 per cent of these earnings (or $11,095,370) were operating expenses strictly. They do not include taxes, which were $682,800, nor certain "additions and improvements charged to income," which amounted to $811,709. Even adding the $1,494,509 of these two items (and they are not strictly operating expenses), the ratio is still 53 per cent, which is, of course, extraordinarily low. It should be noticed that the Northern Pacific rates during the year averaged reasonably well. The receipts per passenger per mile were 2.22 cents and the freight receipts 1.06. There are other roads, however, which get equally good rates and fail to operate at anything like the same low ratio. The immediate means by which the Northern Pacific succeeded in making the showing contained in the present report is clearly set forth in the report itself; but the real explanation is only to be found in the history of the company through the last ten years. For ten years and more—almost since the line across the continent was opened for traffic—the work has been going on in preparation for the day which has now come. Through all the financial vicissitudes of the company and all the sensational changes in control, the work of reducing grades, straightening curves, rebuilding bridges and improving roadbed has gone steadily on. During the last year or two extraordinary attention has been given to everything which could increase train loads and reduce the cost of moving tons—or passengers—revising grades, acquiring heavier locomotives, redistricting divisions and rearranging runs. The effect of this work in the year immediately under review is perhaps best shown by the following comparison of tonnage per engine and train mile for parts of the last two years, the comparison being a rearrangement of a table given in the report:

	Gross tons per engine mile.			Gross tons per train mile.		
	1897.	1898.	In. pr. ct.	1897.	1898.	In. pr. ct.
January	392	474	20.92	600	679	13.16
February	401	497	23.94	519	710	14.70
March	430	508	18.14	643	716	11.35
April	453	521	15.00	601	727	20.96
May	470	528	11.00	615	724	17.70
June	478	521	9 00	929	698	11.00

The increase in the last two months, it will be noticed, is less than in the preceding four. In the summer of 1897 the effects of the good work were already showing themselves. Whether a continued improvement will be possible in the future remains to be seen. General Manager Kendrick, in concluding his portion of the report, says that "it is possible to operate the property more cheaply now than ever before, and there will be further improvement in this direction." On the other hand, President Mellen says "the favorable results of the fiscal year just closed must in prudence be regarded as exceptional." The two statements are not in conflict. Mr. Kendrick speaks out of the fullness of his knowledge of what can be done, only of the possibility of still further reducing the tonnage cost of operating. Mr. Mellen, looking at the finances as a whole, sees that "the favorable winter of 1897-98 and the consequent freedom from accident and blockade, have helped materially to produce the result," nor can the road always count upon the same abundant crops along the western portion of the lines.

The action of the directors in setting aside $3,000,000 as a reserve for maintaining the preferred stock dividend is undoubtedly prudent. There may be no such insufficiency of earnings as will compel the use of the fund for its specific purpose. In that case the money will be turned back to the general funds of the company in 1901. Meanwhile, the reserve is a comfortable thing to have and will give stability to the company's finances in other ways besides its direct bearing on the preferred stock.

The Kansas City, Pittsburg & Gulf proposes to build a hospital for its employes at Kansas City.

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CEREBRAL CONTUSION.

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My object in selecting the subject of cerebral contusion has been threefold: (1) Traumatisms of the head are common and are so generally followed by cerebral symptoms; (2) the practice of classifying all cerebral lesions following injury into cerebral concussion or compression is inconsistent and usually most unsatisfactory; and (3) the etiology, pathology and symptomatology of a large proportion of the cerebral lesions are so nearly identical with those of contusions in other parts of the body that contusion of the brain should be recognized as a distinct lesion of frequent occurrence.

It is commonly taught in the schools and in the text-books that the two conditions of the brain following trauma of the head are cerebral concussion and cerebral compression. One is struck by the variety of conditions and symptom-groups that have been and in most instances are now collected and presented under the general term cerebral concussion in the various text-books on the subject.

A moment's calm reflection should convince any surgeon that the mild, transitory, dazed condition following a slight blow on the head, the condition of profound shock supervening upon the reception of a more severe injury to the head, and the prolonged unconsciousness, mental aberration, muscular incoordination, spasm or paralysis, etc., that sometimes follows injury to the head, do not present enough elements in common to warrant their being classified together under the term of cerebral concussion.

By again referring to our text-books we find that while the unsatisfactory features of such a classification are becoming generally recognized, in only a single instance, so far as I know, has the old classification been discarded. Most writers now include under the head of "concussion" a statement to the effect that many cases are attended with more or less laceration of the brain-tissue, with minute visceral or meningeal hæmorrhages and symptoms varying with the degree of laceration. This condition of laceration of tissue and extravasation of blood, attended with symptoms of more or less permanency, is the identical condition to which I desire to call attention, and to urge that it be recognized as "cerebral contusion," as advocated in Park's Surgery.

The researches of the pathologist enable us to readily distinguish between the various conditions that have been improperly classed under the head of the least serious of all of them.

The term cerebral concussion should be limited to the phenomena presented when the function of the brain has been disturbed by trauma, without the production of any gross mechanical lesion. We recognize two conditions under this general heading; the first is the sudden and transitory disturbance of the circulation and fluid equilibrium of the cerebrum caused by violent shaking or sudden jarring of the head as evidenced by what the laity term "stunning." The condition is in reality but a momentary disturbance of the fluid-equilibrium of the brain, and as soon as the normal equilibrium is restored the patient is perfectly well. There is no possibility of any cerebral sequelas to such an injury. The second condition is also one of disturbance of the circulation, but it differs from the first in that the injury has been of sufficient severity to cause reflex vasomotor spasm and to give rise to the symptoms commonly grouped as

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[This paper is published also in the Philadelphia Medical Journal.—Ed.]

evidence of cerebral concussion; complete or partial unconsciousness, rapid, feeble pulse, pallor of the skin, copious perspiration, dilated but equal and reacting pupils, shallow respiration, muscular incoordination, with occasionally vomiting and loss of sphincter-control.

It will be noted that these symptoms and signs are identical with and undistinguishable from those of "shock," and under the proper treatment for shock they disappear as in that condition. While the shock incident to

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trauma of the head is not due to any gross lesion of the brain, it is barely possible that it may be of sufficient severity in isolated cases to cause death; but this must be exceedingly rare.

By recalling the anatomy of the membranes of the brain we can readily appreciate why injuries to the head cause temporary disturbance of the equilibrium of the fluid-distribution. The cerebral subarachnoidean space is confined by the rigid bony cranial walls, while that of the spinal cord is surrounded by a large plexus of vessels, which admits of its expansion. The free communication between these spaces enables the vessels to serve as a governor or regulator of the tension in the cranium. The size of the brain varies with every respiration and every heart-beat but its tension is equalized by this elastic prolongation surrounding the spinal cord.

The fact is that patients suffering from cerebral concussion of either the first or the second degree mentioned, in its pure and uncomplicated type, recover promptly and completely as soon as the equilibrium of the fluids of the brain is restored.

In contradistinction to the foregoing conditions, which are practically never fatal, a large number of cases of head-trauma have proved fatal. In these cases post-mortem examination reveals hyperemia of the brain and possibly of meninges, usually with more or less exudate and extravasion of blood caused by the rupture of minute vessels, occasionally thrombosis of veins, and not infrequently in the more serious cases positive lacerations, with small distinct localized cerebral hæmorrhages are detected.

While these are most commonly found at a point corresponding to the site of the trauma, the peculiar anatomic construction of the calvarium and the intimate relationship with it of the membranes and the brain render injury to the blood vessels and even the brain at the opposite end of the pole of exceedingly common occurrence. Hæmorrhages of punctate character are liable to be overlooked unless the sections of the brain are numerous and carefully made. When they cause the fatal issue their location will usually be in and about the medulla.

It will have been noted that these lesions are identical with those of contusions of the soft parts in other parts of the body, and, therefore, in at least a pathologic sense we are justified in considering cerebral contusion as a definite lesion. The term "cerebral compression" indicates a mechanical disturbance of the cerebral circulation caused by an increase in the intracranial pressure, which may be the result of hæmorrhage, depressed fracture, tumors, or inflammatory exudates.

In addition to the identity of the lesions produced by all contusions, we find that the symptoms correspond with the behavior of such lesions generally, being modified only by peculiarities of the organ's structure and function and its encasement in unyielding walls. The symptoms of shock are first noted;

but, instead of disappearing, some of them persist, and others are changed; while in many instances new and variable symptoms develop, demonstrating positively that all of the conditions did not arise at the moment of injury, but that the occurrence of hæmorrhage or exudation has produced new symptoms. The pallor of the skin and the profuse perspiration disappear, the pulse becomes slower and fuller, the respiration slower and deeper, the degree of unconsciousness may become less or it may give way to a condition of stupor or of actual

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mania; in addition to muscular incoordination there may be muscular spasm, which may, in turn, be followed by paralysis. These symptoms are of great importance in determining the occurrence of cortical hæmorrhage or exudation, and, should it be localized, they will serve a good purpose in locating the area for surgical treatment should the symptoms persist. The symptoms usually disappear in the course of from a few days to weeks, but as there are definite lesions that may have destroyed certain foci, or that require cicatrization, the resultant symptoms may persist and even become permanent. If pronounced hæmorrhages occur, symptoms of cerebral compression will manifest themselves.

In making a diagnosis of cerebral contusion it is necessary to exclude alcoholic and uremic coma, meningitis and non-traumatic apoplexy. Examination of the breath, urine, temperature and blood vessels will usually render this easy, although a combination of two or more of the conditions might render it difficult and in some cases impossible. An alcoholic breath, with subnormal temperature, is characteristic of alcoholic coma; high temperature, with a bounding pulse, signal the presence of meningitis; while the presence of albumen and casts in the urine, and œdema, with an absence of trauma, etc., would cause one to suspect uremia, and, likewise, the presence of a non-traumatic apoplexy should be suspected if, in an atheromatous subject, there was sudden paralysis, without any evidence of contusion, and especially if the temperature was first subnormal and later became normal.

The prognosis of cerebral contusion, like contusion in other parts of the body, depends upon the location, character and degree of the lesion and the presence or absence of infection. Unless some vital center is involved, or the hæmorrhage and extravasation cause marked compression, or infection with inflammation supervene, the case will probably pursue a favorable course, and after a variable time result in a practical cure. Frequently,

some slight muscular action or mental function is permanently disturbed; unfortunately these conditions occasionally persist permanently to a marked degree.

The treatment of cerebral contusion is like that of contusion elsewhere. If diffuse and non-productive of focal symptoms it should be treated symptomatically and special attention be given to the securing of asepticity of any wound that may be present, and to the establishment and maintenance of good excretion, with the additional precaution to use diffusible cerebral stimulants cautiously, if at all. The maintenance of physical and mental rest is essential. Cold is as serviceable here as in other parts of the body, and its use should be more strongly advised. If there are evidences of local extravasation, to the extent of interfering with the nutrition or the function of the part, producing cerebral compression, etc., the cranium is to be opened and the tension relieved, just as if the contusion was of the forearm. This is also indicated when the symptoms are focal in character and especially when they are progressive, e. g., multiple, diffuse punctate hæmorrhages in the motor region would usually cause muscular contractions and spasms, and later paralysis might result. Such a sequence would indicate distinct hæmorrhage if of early occurrence, or exudation if later, of sufficient amount to admit of its possible removal or relief of tension caused thereby by trephining. When symptoms persist potassium iodid is as strongly indicated for the absorption of the exudate as in other parts of the body.

The following brief reports of a few cases present evidences that have distinct bearing upon the subject:

Case I: Several years ago, when I first entered upon railway work, Mr. G., 42 years of age, and in perfect health, was supervising the work of retracking a derailed car, when the chain in use broke, the end striking him in the back of the head near the midline above the superior curved line of the occipital bone, inflicting a scalp wound two inches long. The man became immediately unconscious and was taken to the hospital. I saw him in less than half an hour, when he presented the ordinary evidences of shock. The skin was pale and moist, respiration was sighing and at times Cheyne-Stokes in type, the pupils were slightly dilated but equal and active, involuntary evacuations from bowels and bladder took place, the pulse was rapid but of fair quality, and no evidence of paralysis or of fracture was present. I had the good fortune to have received my surgical teachings under the celebrated Gunn and the distinguished Parkes, and their admonition to administer cerebral stimulants cautiously, if at all, after an injury to the head came to my mind as being especially applicable in that case. There was nothing to indicate the use of stimulants save the unconsciousness, and I well remember how severely my do-nothing policy was criticised by the relatives and friends of the patient. An elderly surgeon was called in consultation, and after a thorough explanation of what had been done and the reasons therefor he fortunately agreed with the waiting policy. I remained with the patient for fully two hours, watching his pulse and general condition carefully, lest neglect should be charged, as I was not giving anything to the patient. During the next few hours, when reaction was taking place, I was amply rewarded for what I had, or rather had not, done. Heat was the only measure employed in combating the shock. When reaction began, it came on with a rush; the face became flushed, the pulse bounding, and the temperature rose rapidly. There had been from the first considerable uneasiness, but as reaction progressed the man became quite violent in the use of his limbs. The prognosis seemed exceedingly bad at this time; a fatal termination appeared inevitable. The knowledge that I had not contributed to the cerebral hypercongestion by the administration of unindicated circulatory stimulants was indeed exceedingly comforting.

The patient remained completely unconscious for nearly two weeks and then began to show some signs of intelligence, and in the course of six weeks his mind became clear; only a slight deficiency of acuteness of vision and a slight but noticeable hesitation in talking remained as relics of the disaster.

During convalescence he was at times delirious, at others foolish, and occasionally he manifested symptoms of acute insanity. In the absence of focal or general evidences of cerebral compression we naturally called the case one of "concussion with delayed re-

covery," and did not deem operative treatment advisable.

The diagnosis did not satisfy me then, and in more recent years, since I have had opportunity for more observation, I have considered this case as having been one of cerebral contusion, with probably considerable laceration of the brain and extravasation of blood in the cortex and membranes in both the occipital and frontal regions. I believe the symptoms first presented to have been those of shock, pure and simple, but as extravasation and exudation occurred in the contused and probably lacerated areas, the evidences of irritation of the cortex became manifested in the constant and at times general use of the muscles of the whole body, with the delirium. The intellect, vision and the cortical functions generally became clear as the extravasations become absorbed or condensed, until after a few months the man was completely cured. Certain it is that the usual evidences of cerebral compression were not present here, and equally certain it is that something more than a simple concussion or shaking of the brain was sustained.

Case II: About three years ago I was called to a wreck of the "limited" express and found a fireman who had sustained a most extensive wound of the forehead and a fracture of the frontal bone, and presenting marked evidence of shock. The fragments were greatly depressed and some had been driven into the brain substance, which was oozing from the wound.

I disinfected the wound thoroughly and as soon as possible brought the man to the city and elevated the fragments to their normal position and supported them on a framework of crossed catgut. There were no focal symptoms, excepting marked Cheyne-Stokes respiration. The patient was exceedingly restless and threw his limbs about constantly. He died in about eight hours; and upon post-mortem examination, minute hæmorrhages were discovered in and about the medulla. There was no other lesion detected except the laceration, with extravasations in the frontal lobe.

This case illustrates that extensive depression of the skull may be present without presenting the clinical evidences of compression, providing a special focus is not involved and the wound is open and so situated that increase of intracranial tension does not occur; that multiple extravasations can be produced at the opposite side from the injury; that, as in most fatal cases, the minute hæmorrhages were in and about the medulla, and that all the lesions were identical with contusions and lacerations of soft parts in other parts of the body, their special importance here being due to the specialized function of minute areas and tracts of the brain.

Since that time I have seen a number of cases in which recovery from shock was exceedingly slow, and some of which did not present any evidence of cerebral compression, while others did. I have selected two cases as illustrations.

Case III: On December 25, 1897, a man, 46 years old, was found unconscious on the street. Examination at the time of his admission to the hospital revealed a pulse-rate of over 100, a temperature of 99 degrees, and respirations of 28. No atheroma was detectable, and no œdema. The pupils were equal. Unconsciousness was nearly complete. There were evidences of a slight contusion, one and one-half inches long, over the left temple, and a slight diffuse contusion over the right temporal region. Upon entrance there was spastic paralysis of the muscles of the left leg and arm, with total paralysis of the left side of the face. The scalp was incised by the house surgeon and the absence of a fracture demonstrated.

I saw the patient on the second day, when the paralysis of the left side was complete. Pulse, temperature and respiration showed slight increase, while unconsciousness persisted.

The diagnosis of a diffuse cortical hæmorrhage in the right Rolandic area was made, and an exploratory operation decided upon. An oblong button of bone was removed, readily exposing the high motor region. The meninges were greatly congested. An infinite number of punctate hæmorrhages were detected over an area about one and one-half inches in diameter, in which the brain substance was pulpified. The finger was readily pressed into the disorganized brain substance for over an inch, with practically no resistance. The brain presented the appearance of being filled with grains of powder. Careful explora-

tion with probe, aspirator and finger was made without detecting any large hæmorrhage. The opening of the dura relieved the cerebral tension noticeably, and immediately the pulse became regular and the respiration slower and easier. The dura was closed, the button of bone replaced and a capillary drain was inserted. The patient gradually became weaker and more deeply comatose, and died on the fifth day.

In this case we are able to positively demonstrate the ordinary appearances and lesions of contusion, with disintegration of brain-tissue, without fracture, which terminated fatally, even after relief of cerebral tension by aseptic trephining. The presence of progressive focal symptoms indicated a local gradual compression or destruction. The operation demonstrated positively the nature of the lesion and enabled us to treat it intelligently, although, in this particular case, unsuccessfully. Post-mortem examination would probably have revealed numerous basilar and medullary punctate extravasations.

Case IV: On March 27, 1898, Mr. A. M. was admitted to my service in the Cook County Hospital, having been found unconscious on the railroad tracks. He was unconscious, his pulse was rapid and fairly full, his respiration labored, his pupils equal and slightly contracted and reactive. The surface of the body was dry and of normal appearance, and there was no paralysis of the sphincters or of other muscles. There had been slight hæmorrhage from the nose. A contused, lacerated wound of scalp on the vertex posteriorly and a slight abrasion of the face were noted. No fracture was detected upon exploration.

The treatment consisted in thorough disinfection of the whole head and careful closure of the scalp by sutures. Shortly after admission it was noticed that the patient threw his arms about considerably. The uneasiness increased and in the course of two or three days there were distinct jerkings of all the extremities. The man was in almost constant motion. He was absolutely indifferent to everything and everybody during the greater part of four weeks. Liquid nourishment was given him from a spoon for a number of days. The bowel movements became involuntary. The temperature was never above normal, while the pulse-rate varied from 72 to 90, and the respirations from 18 to 24. There was at no time any focal symptom. About the eighth day the patient began to manifest some intelligence and would answer questions intelligently. For two weeks he exhibited some improvement; moments of lucidity would appear between longer intervals of wandering delirium.

During the fourth week the man became somewhat stubborn at times and on the thirtieth day he developed acute mania. At last accounts he was under treatment in the county insane asylum.

There was but slight evidence of concussion or shock in this case, and there were certainly no clinical evidences of "cerebral compression" at any time. The symptoms were due to the extravasation of blood and later the occurrence of exudation as the result of the contusion of the brain and the membranes.

I maintain that all of the foregoing cases were instances of cerebral contusion, and that the varied results were dependent upon the degree, extent and location of the lesions characteristic of contusions. From the consideration of these cases and the facts already mentioned I believe we are justified in making the following deductions:

1. The term "cerebral concussion," as generally employed, is indefinite and unsatisfactory, and inconsistent with modern ideas of pathology and precision.

2. The term "cerebral concussion" should be limited to those phenomena resulting from disturbance of the function of the brain by trauma, without the production of gross mechanical lesions of the brain.

3. The slightest manifestation of concussion is due to disturbance of the fluid equilibrium of the brain and is always of momentary duration and effect.

4. More severe concussion produces spasm of the vasomotor system and results in the production of signs and symptoms that are identical with and undistinguishable from those of shock, and which persist until the circulatory equilibrium is restored and not thereafter.

5. The gross mechanical lesions of the brain produced by trauma, with or without fracture of the skull, are identical with those of contusion elsewhere.

6. The clinical history corresponds with what we should naturally expect from a contusion of tissues of such delicate structure and of such specialized function with such anatomic relations.

7. The treatment of contusion of the brain is the same as that of contusion elsewhere, with the special demand for the early treatment of complications.

8. The term "cerebral compression" indicates a mechanical disturbance of the circulation of the brain by any lesion that materially increases intracranial tension.

DISCUSSION.

Dr. H. L. Getz, Marshalltown, Ia: We have not yet attained to the acme of perfection in differential diagnosis of the injuries of the brain, spinal cord, and nervous system in general. This is accounted for in part, at least, by the fact that they are well protected by strong bony encasements, and so in most instances when we meet with the difficulties or conditions discussed in the paper, the delicate organization of the brain and the extent and character of injury done cannot be readily and accurately determined as may be done in contusions when the same occur in other parts of the body where inspection by the eye and examination by touch enable us to arrive at a definite and correct conclusion of the extent and character of the injury sustained or existing.

I believe that the term cerebral concussion may not always be limited to cases presenting phenomena resulting from disturbance of brain function by trauma, because I can understand that there may result such a degree of disturbed cell equilibrium without actual trauma existing, as will to all intent and purpose amount in result to the same thing as when the most severe compression or contusion exists. A degree of compression precedes a state of contusion as necessarily as a congestion precedes an inflammation.

If this theorizing is correct, then we may also conclude that these cases which the doctor classes under cerebral concussion do not always recover. The doctor speaks of the persistence of shock until the circulatory equilibrium is established. Before the circulatory equilibrium can be established it is necessary for the nerve currents to be re-established by both generation and transmission, and so the heart and other vital organs receive their necessary stimulation. The establishment of circulatory equilibrium is, therefore, as may be readily seen, secondary in these cases.

The doctor's statement that "gross mechanical injury of the brain, the result of trauma with or without fracture of the skull, is identical with all other contusions of the body," I think, may, in a degree, be received with doubt, because it seems to me that a contusion of the brain, owing to its friable and delicate structure, must mean (when existing of moment to be recognized as a contusion) complete and permanent destruction, and, at least, permanently impaired function. Such results are not by any means universally found in contusions of the stronger, more tense and firmer tissues of the body.

In conclusion, the doctor says, "the term cerebral compression indicates a mechanical disturbance of the circulation of the brain by any lesion which materially increases intracranial tension." While this is no doubt true in part, we may also properly, I believe, attribute a part of the symptoms of these cases to the impaired function of nerve cells primarily, and also in part to the secondary effects produced upon the circulatory system, the result of impaired function of nerve cells and so lessened generation of nerve current.

Dr. W. B. Outten of St. Louis, Mo.: I do not like to let such a paper as has been read by Dr. Bouffleur go without further discussion; I want to say that I like Bouffleur's classification. If any of you gentlemen have gone over the surgery of early days and taken the length and breadth of a contusion, you know it may extend in some cases until the ganglion cells are involved as well as the tissue beneath. We have all seen cases where a car wheel has passed over a limb and the skin has remained intact. This we call a simple contusion. When, however, we have the part crushed to a pulpy mass we have a different condition. I take the expression contusion because it conveys the idea of the condition of the case, it simplifies matters. In connection with this subject I commend the Textbook on Surgery by Dr. Park, on account of the commonsense view taken all the way through. The same is true of the American Textbook of Surgery, which deals with this subject in a practical way. Dr. Bouffleur has certainly given us a

good, plain, commonsense classification which will serve as a guide in the consideration of this subject.

Dr. W. H. Elliott of Savannah, Ga.: I have long disliked the term concussion, as it is very confusing in that it does not distinguish between cause and effect. When a person receives a blow on the head the brain is necessarily jarred. But it is not a question whether the brain is jarred or not, but the question for the surgeon to determine is, what did the jar do to the patient? If a man fell out of a window we would not make a diagnosis by saying that he had a fall, but we would want to know the result. And so the term concussion is a very confusing one, and for that reason alone ought to be dropped. Another reason why it ought to be dropped is that it is not a clear one. We, as railway surgeons, wish to know the condition of the brain after the receipt of an injury. But the main point is this: I do not believe a patient can have any very serious cerebral symptoms unless there is some gross lesion. You could undoubtedly determine this if you could look in there.

I had an article sent to me by my friend, Dr. Charles Phelps, of New York, in which he gives the results of twenty-six post-mortem examinations, and I throw out those where there was no fracture of the skull; I simply give you the facts and let you draw your own conclusions. Of these twenty-six post-mortems there was an average of nearly two and a half gross lesions in every fatal case, and therefore I am led to believe that when a person has serious cerebral symptoms, which do not prove fatal, he has a gross lesion from which he recovers.

Dr. Bouffleur (closing the discussion): I have nothing further to add except to mention one point brought out by the two previous speakers. Dr. Getz is inclined to doubt that the first case was one of contusion on account of the early recovery of the patient. I wish to call his attention to the fact that the patient did not entirely recover for a number of weeks, and that he had a slight defect in eye sight as well as a slight defect in speech. I believe in this case we had contusion in two areas, and there was an extravasation of minute hæmorrhages which prevented the development of one part as quickly as the other portion. For two weeks the patient was absolutely unconscious and did not recognize a single word spoken by any member of the family. I believe we had something more than concussion in this case. We know the brain is quite friable when taken out of its encasement; that when in its normal surroundings it is not especially friable but elastic. Take the brain and turn it upon its side; it becomes flattened in the opposite direction; at the same time it does not impair it, its structure is exceedingly delicate. When we have a laceration we, of course, have the phenomena of contusion. If I strike my arm I jar it and after a short time I have a tingling sensation in it which is analogous to stunning. If you take a hard stick and tap your head with it you will have the phenomena which accompany a stun. All is over in a moment or two, and my arm ceases to have that feeling of agitation incident to the shock. If I hit my arm more violently I would doubtless cause a black and blue mark in a day or two which would indicate that rupture of the vessels had taken place underneath the skin. All of these are the effects of contusion of the part locally. The swelling, extravasation of serum and blood, later on exudation, are all phenomena of contusion, and we have just the same thing in the head. If we have the same thing in the head the symptoms will remain as long as the contusion remains. I still insist that some cases get well after laceration of brain tissue. A laceration may occur as it occurs elsewhere in the body, and parts of the brain heal with scar tissue. If the laceration be in the motor area, the function of which we know, we are likely to have persistent symptoms, but in areas we do not know the function of we may have persistent symptoms for a long time.

A member of this association reported the case of a woman who received a kick in the forehead. A large area of the skull in the frotal territory was removed, including a handful of brain substance. This operation was done in preantiseptic days. The woman progressed towards recovery perfectly, had no disturbances at all, and healing took place by the formation of scar tissue. The accident occurred when she was a child, before that part of the brain became functionating, and other portions of the brain made up for it, and there is no difference so far as the function of intelligence or of speech is concerned, although

she lost a large amount of brain substance.

This case shows that we can have extensive laceration in any part of the brain, the function of which we do not know, which may heal by scar tissue and never leave any permanent symptoms.

It seems to me we should make a distinction between cerebral concussion and cerebral compression. Cerebral concussion is one thing and cerebral compression another. Cerebral compression should be restricted to mechanical interference with the circulation, be it a tumor, inflammatory products, foreign bodies, or depressed bone. Anything which interferes mechanically with the circulation of the brain produces the symptoms which we collectively call cerebral compression.

The classification I mentioned in my paper is advocated in Park's Surgery, and it is the only surgery which I know anything about that has it. All other surgical works treat of concussion, including laceration and compression.

Dr. Outten: The American Textbook of Surgery refers to cerebral laceration.

Dr. Bouffleur: I do not think it speaks of cerebral contusion. It is a point that should be emphasized.

Another thing. From a railway standpoint, I believe we owe it to our profession and to the roads we represent to dispense with the use of the word concussion on legitimate grounds. It has such a financial ring to it. It is not only recognized by professional people, but by professional abstractors of money and by common laborers. If we use the word, we should do so properly, but where it does not apply it should be dropped.

Our collaborator, Dr. John Punton, has purchased "Langsdale's Lancet," of which he has been a department editor since its foundation, and changed its name to the "Kansas City Lancet."

Dr. W. F. McLean of Elyria, Ohio, died in a Masonic lodge room on October 5, after an illness of only a few minutes. The doctor had suffered for years from heart trouble, and was 65 years old. He had been surgeon for the Lake Shore for many years and was a member of the I. A. R. S. The doctor was an alumnus of the Long Island Hospital Medical College class of 1876..

FOUR CASES OF PROBABLE LACERATION OF THE BRAIN FROM RAILWAY INJURIES.*

By Howard J. Williams, A. M., M. D., of Macon, Georgia,

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The title of this paper implies an uncertainty in the writer's mind of the exact lesion existing within the cerebral cavities of the four patients whose histories he is reporting. Indeed, until Dr. Charles Phelps' work on "Traumatic Injuries of the Brain" had been studied, and a careful comparison between the clinical notes (taken months before the book was read), and his lucid description of the symptomatology of contusions and lacerations had been made, no satisfactory diagnosis was arrived at in these cases.

From the vague ideas of concussion and compression of the brain of the older writers we are coming to a knowledge of a clear pathology, and see in all cases of cerebral traumatism a distinct lesion, a thing exact, a demonstrable entity. What the exact lesion may be we cannot always assert in life, since our knowledge of an exact symptomatology has not yet advanced to the degree at which intra-cranial hemorrhage, cerebral contusion, and laceration of the brain can be absolutely differentiated. However, there is promise that such exactitude is near at hand. No one in recent years has done so much to clear up the symptomatology of these lesions as Dr. Phelps, and his valuable book will give inestimable aid in future studies of cerebral traumatisms.

Excluding obvious fracture and depressed bone, which readily explain pressure symptoms, there must be in cases of cerebral traumatism either one of the following conditions: Hemorrhage, contusion of the brain or membranes, or laceration of the cerebral tissues. It is rare, however, to find either of these conditions isolated. Usually they are combined in varying degrees, the violence inflicting the injury rarely expending itself in a single lesion. The symptoms of each, therefore, become merged into those of the other; but ordinarily the preponderating lesion

* Read by title at the eleventh annual meeting of the I. A. R S., Toronto, 1898.

should give rise to symptoms sufficiently clear to point to its presence.

Hemorrhage may be epidural, pial, cortical, or parenchymal, indicating the source and location of the bleeding. Epidural is the most frequent form, and is most productive of pressure symptoms; pial hemorrhage is the least extensive, while cortical and subcortical bleeding commonly attend lacerations. The symptoms attending hemorrage are due to, first, shock; second, decrease of the capacity of cranial cavity; and third, exsanguination of the patient. The cranial capacity may be decreased by hemorrhages confined within the skull; pressure is then exerted on the brain,

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obliterating by mechanical compression the cerebral arterioles and capillaries, and inducing an acute anæmia, which interrupts the nutrition of a lobe, a hemisphere, or the entire encephalon, and causes arrest of functional activity of a part or the whole brain. Exsanguination may prove fatal if a large vessel or sinus is broken or a compound fracture is present.

Contusion of the brain exists to some extent in all head injuries; as an isolated lesion it is infrequent. The anatomical changes are distension of the parenchymatous vessels, formation of minute thrombi, punctate hemorrhages and more or less serous extravasation. It may be limited or general. The former, which is confined to a variable area in the cortex or subcortical area, is rarely seen in autopsies unless it co-exists with other lesions of greater magnitude. It is the lesion which is commonly present in those cases formerly diagnosed concussion, and is the localized expenditure of limited force. The general form may involve an entire hemisphere or a single lobe, and as it is a universal disorganization of the tissues, it should be considered a regional lesion. It is the expression of general diffusion of violent force. Contusion of the membranes is restricted to the pia-mater, and is characterized by limited hemorrhagic infiltrations of the pia and serous transudations from its overdistended vessels. It is never an isolated lesion.

Laceration of the brain as an isolated lesion is as infrequent as general contusion. The brain matter is torn either in single spots or several, and the extent of the tear varies from a pea to the destruction of an entire lobe. The walls of the excavation are broken down in shreds, its cavity filled with blood clots, while the surrounding tissue is hyperæmic, œdematous, and contains punctate extravasations. The hemorrhage may be sufficient to escape and cover in a thin layer a lobe, or it may break down the brain tissue. The lesion is oftenest found in the cortex or parenchyma of the base of the frontal or temporal lobes, and almost invariably occurs at a point opposite to that of the impact. It is the final expression of the expenditure of force in its greatest intensity.

Contusion and laceration being the direct results of destructive violence, applied directly or indirectly to the head, the symptoms are those of shock and disorganization of tissue expressed by obscuration of functions. Shock is the first symptom of all head injuries, as it is of violent traumatisms elsewhere in the body; it is the condition formerly known as concussion of the brain, when the head is involved. In the lesser grade of contusion it passes off with the return of consciousness; in the graver lesions, the unconsciousness is followed by the symptoms of hemorrhage or disorganization, as the case may be.

With this brief review of the pathology of these lesions, I shall proceed with the report of the cases and then discuss their symptomatology.

Case No. 1. G. M. G., 21 years, white, brakeman, on Oct. 2, 1896, was struck by an overhead bridge on the left temporal region

just back and above the ear. He walked back over his train to the caboose, was dazed and could not tell what struck him. Blood was discharging from the left ear and from a slight wound one inch long back of the ear. Two hours later he had a temperature of 101, respiration 14, pulse 84, right pulse full and compressible, left feeble; still knew nothing of the accident, could answer questions, but speech and manner silly. There was no paralysis, except involuntary urination the second day.

The third day was restless, mind dull, had headache, and remembered nothing of the accident. The temperature was 99.6, respiration 17, pulse 68, both pulses of equal volume. Serous discharge from the ear.

Eighth day, restlessness and mental hebetude, increased delirium at night, temperature 98.8, pulse 70, respiration 18, no discharge from the ear.

Fifteenth day, constant delirium, lips partially paralyzed on the right side, right eye nystagmic and pupil dilated, left pupil contracted, temperature 97, pulse 72, respiration 14.

Eighteenth day, so hard to control he was taken to the hospital. Bowels and bladder again involuntary, temperature 96.8 to 99, pulse 70 to 80, respiration 13 to 16.

From this date to the thirty-second day the mania was so violent that he had to be put in a restrainer. The eye symptoms and paralysis of the lips continued. Temperature constantly subnormal.

By the thirty-eighth day the mania had lessened and other symptoms improved.

On the forty-fifth day he was sent home improved and sitting up some.

By the fiftieth day his mind was entirely clear; but, as he expressed it, he had an irresistible impulse to fight the people passing his home, which compelled him to remain indoors. The succeeding twenty days he spent in the country to recover strength, and on the eightieth day returned to work completely restored.

From a brakeman he has been promoted to a fireman's position, and has not lost a day from work during the past eighteen months.

Case. No. 2. J. R. N., 38 years, white, engineer, fell, Oct. 10, 1896, from his engine while on a trestle, twenty-five feet to the ground, landing on the buttocks in a sitting position. He was taken up at once, without any external signs of violence on the body, but unconscious. One hour later, when I saw him, he had not regained consciousness; had clonic contractions of muscles of both arms; pulse 64, respiration 30 and stertorous; face cyanosed. Three hours after the accident he was put in the hospital, still unconscious. Respiration 16, pulse 90, full and compressible on the right side, very weak on the left, temperature 102.6, pupils dilated, limbs constantly moving, right angle of the mouth slightly paralyzed, sphincters relaxed.

The unconsciousness lasted twenty hours. He then roused up sufficiently to recognize and speak to friends. Was quiet, but indisposed to be disturbed. Occasional muscular jerking of the upper extremities. Temperature 97 morning, 98 at 8 p. m., pulse 62, volume still unequal, respiration 16, bladder catheterized.

The third day, restless, irritable and dull mentally, temperature 99.4, pulse 96, inequality of volume disappeared, respiration 28, sphincters under control, pupils normal.

The fourth day, very irritable, at times delirous, avoids the light. Temperature 99.8.

The fifth day, wildly delirious, requiring restraint. Photophobia. Temperature 99.

The seventh day, still maniacal, no control of sphincters, temperature subnormal, pulse 60, respiration 16.

The tenth day, no control of sphincters, temperature 97, pulse 88, respiration 26.

Twelfth day, paralysis of deglution, stupor, temperature 102.2, pulse 140, respiration 46.

Thirteenth day, coma, temperature 104, pulse 160, respiration 60. Death 6 p. m. Post-mortem temperature not taken. Autopsy not allowed.

Case No. 3. M. H., 20 years, white, tramp, a sleep-walker, during the night of May 10, 1897, jumped in his sleep from an empty box-car while the train was in motion. His partner, who saw him jump, got off at the next stop and went back to look for him; found him at 5 a. m. unconscious. He was brought to Macon and put in the hospital at 9 p. m., May 11. Some slight bruises on the vertex. He was still unconscious, but could be roused, and made attempts at answering questions.

Temperature 101.4 left axilla, 102 right, pulse 68, respiration 28, pupils not abnormal, involuntary urination.

Second day, delirious, but could tell his name and residence. Temperature 96, pulse 56, respiration 16, sphincters relaxed.

Third day, slightly maniacal, restless, irritable when touched or noticed. Temperature 98, pulse 48, respiration 16; passes urine and fœces voluntarily.

Fifth day, mania ceased, but had hallucinations. Temperature 97, pulse 50, respiration 20.

From the sixth day he gradually recovered his mental faculties, but would have periods of uncontrollable anger without provocation. On the fifteenth day he was sent to his home better, but not entirely recovered. Subsequent history unknown.

Case No. 4. E. N., 21 years, negro, trespasser, was struck on the right side of his forehead by a passing train, July 8, 1897, while standing in one of the freight yards. No external evidence of the injury except slight œdema of the scalp over the right frontal eminence. Six hours later in the hospital, while he was still unconscious, he could be roused to answer. No paralysis. Pupils equally contracted. Temperature 101.6, pulse 88, respiration 28, sphincters relaxed.

Second day, conscious but dull, and speech incoherent. Temperature 101, pulse 78, respiration 18; catheterized.

Third day, still incoherent in speech. Temperature 98.4, pulse 100, respiration 18; sphincters under control.

Fourth day, restless and irritable, Temperature 100.6, pulse 66, respiration 22.

Sixth day, headache, and at times delirious at night. Temperature 99.4.

Eighth day, stupid, tries to get out of bed. Temperature 101.2.

The next five days was mildly delirious, and when addressed would refuse to reply or would speak slowly. Temperature normal. On the fourteenth day, was dazed and nervous, would answer intelligently but slowly. Was discharged on the thirtieth day apparently well. Subsequent history unknown.

Of two hundred and twenty-five cases examined on autopsy by Dr. Phelps, he found fifty-three in which the lesions were isolated, thirty-one were hæmorrhages, eight were general contusions, and fourteen were lacerations. These were cases in which life was sufficiently prolonged to make careful observation of the symptoms. In many cases of combined lesions he was able to arrive at a probable diagnosis of the predominant injury, which was confirmed by later post-mortem examinations. From these observations and examinations he has drawn a classified symptomatology, from which I have taken the liberty of making the following table for differential diagnosis:

From this table it would seem that the characteristic symptoms of laceration are: early high temperature, a prolonged unconsciousness, variable in degree and character, followed by delirium and other marked psychic symptoms; usual escape of muscular disturbances; loss of sphincteric control. The pupil, pulse and respiration abnormities are not to be relied upon in any cerebral lesion, since they are too inconstant.

In reviewing the symptoms of the four cases under consideration it will appear that they correspond closely with those of laceration given in the table, and, therefore, while it is possible that other lesions may have coexisted, the probability is in favor of laceration as the predominating lesion. In all of them there was prolonged unconsciousness except one (case 1). In this case from the beginning an abnormal mental condition existed, attended by ignorance of the cause of the accident. If there was any primary unconsciousness, it must have been very brief; for the conductor of the train says it was not three minutes after passing the bridge before he returned to the caboose in a dazed mental condition. In his case there was evidence of concomitant fracture of the base of the skull. All had delirium following the primary injury coming on at variable intervals and in different degrees. The psychic disturbances were marked irritability (cases 1, 2, 3), delusions (1, 3), incoherence (2, 4), apathy (4), uncontrollable anger (3), mania (1, 2, 3).

Muscular disturbances occurred in one (2), clonic contractions, almost convulsive, while the lips were partially paralyzed in two (1, 2), and nystagmus in one (1) was present late in the disease, perhaps due to secondary changes. All exhibited loss of control of the bladder

HÆMORRHAGE.	GENERAL CONTUSION.	LACERATION.
Unconsciousness. Almost universal; variable as to time, profound in the majority, usually permanent.	Usually present; is primary, variable in degree and duration.	Usually present; is primary, variable in degree, usually prolonged; other mental conditions may take its place.
Delirium. Exceptionally present, then due to concomitant lesions.	May be present, variable in time, usually mild.	Almost always present soon after return to consciousness, extremely variable in degree.
Psychical Disturbances. Quite infrequent.	Variably present; hyperæsthesia occasionally, headache frequently, somnambulism, irritability, vertigo often present.	Characteristically present; mania, apathy, intense, irritability, delusions, etc., almost constantly present.
Muscular Disturbances. Occasionally present; paralysis, convulsions, muscular rigidity, diagnostic if present.	Exceptionally present.	Likely to escape, unless motor areas are affected.
Loss of Sphincteric Control. May be present.	May be present.	Almost universally present.
Pupils. No characteristic change, except unilateral dilatation, when the third cranial nerve is pressed upon.	Generally normal.	Variable.
Pulse. Variable in frequency and volume; bilateral inequalities in volume sometimes present.	Variable, usually increased in frequency; bilateral inequalities occasionally present.	Variable, rarely exceeds 90; bilateral inequalities sometimes present.
Respiration. Variable; only characteristic symptom, extreme slowness when pons and medulla are pressed upon.	Variable.	Variable; if any change it is hastened.
Temperature. Uncomplicated hæmorrhage, normal or subnormal, low range if life is prolonged.	Never subnormal, never high, 99 to 101, recession protracted, bilateral variation occasionally present.	Primarily high, 101 to 104, recession often prolonged, continues to rise preceding and following death. Bilateral variation frequent, but not diagnostic.

and rectum, one in which unconsciousness was not present (1) had this condition on the second day.

The temperature in all was elevated. In case 1 it rose to 101 in two hours; in case 2 it was 102.6 three hours after the accident; in case 4 it was 101.6 after six hours. Case 3, some eighteen hours after the injury, had a temperature of 101.4 in one axilla and 102 in the other. This bilateral difference was accidentally discovered in testing the value of an unregistered thermometer, compared with one long in use. Repeated changes disclosed the difference in the axillary temperature. In this case the fact that the early temperature was unknown would weaken the diagnosis if the psychic symptoms were not so characteristic. Prolonged recession was exhibited in two cases (1, 4), and ante-mortem rapid rise in one (2). Unfortunately the post-mortem temperature was not observed in this case.

The abnormalities of the pupils, although

not of any diagnostic value, were present in three cases, equally dilated in one (2), equally contracted in one (4), and contracted on one side, dilated on the other late in one case (1); this may, however, be attributed to the secondary conditions.

The pulse varied from 64 (2) to 88 (4) in the four cases. Bilateral variations in volume existed in the two cases (1, 2) suffering the greater lesions. This condition of the circulation I have seen in other severe head injuries, compound fractures of the skull, and it was alway a matter of mystery to me.

The respiration was excited in three (2, 3. 4), and lowered in one (1). In none was the respiration-pulse ratio normal, but the abnormality was not marked.

That the injuries in these cases were limited to the base of the frontal lobes is clearly indicated by the disturbance of the mental functions and absence of marked muscular abnormalities. In one (case 2) there may probably have been some lesion of the temporal lobe, as some paralysis of the lips existed and there was some clonic muscular contractions early in the case. The probability of this condition is further sustained by the direction the force was transmitted. The man fell on the buttocks in a sitting position.

Diagnosis by induction or inference from symptoms to lesions, as in these cases, three recovering and one fatal without post-mortem, is the only sure method at which a probable diagnosis of the lesion and its site can be made in life, and should be combined with the method of exclusion in all such cases.

INTRA-ABDOMINAL TRAUMATISMS.*

By A. F. Jonas, M. D., Omaha, Neb.

I know of no class of injuries that fill my mind with so many doubts and perplexities as those affecting the abdominal viscera. We are called to attend the injured in a wreck, we come to one or more individuals who have sustained traumata of the abdominal region of varying degrees. Experience has taught us that the immediate manifestations are no index of the extent of the mischief. An individual in a profound state of shock, unconscious, almost pulseless, with an extensive contusion of the abdominal parietes, a picture most alarming, but the recovery may be rapid and complete. Another, with a contusion apparently trivial, circulatory and central disturbances of moderate degree, may be followed by the gravest complications. Those of you who have seen many cases of abdominal injuries from external violence, blows and falls, have learned that the force of the external violence is not always followed by a corresponding degree of intra-abdominal injury. A severe and direct blow upon the hollow viscera may cause very transient disturbances, while another, very much less severe, upon the same organs in the same region may produce intestinal lacerations or fatal hæmorrhage.

Diagnosis of intra-abdominal affections has made great strides in recent times; much has been disclosed that has become of material value in assisting us in forming a correct conclusion.

With the hope that the exchage of our individual and collective experiences may result in throwing some light upon this subject, so full of doubt and uncertainty. I have put together such facts, culled from surgical literature and my own experience, for which I beg your indulgence to-day.

When brought face to face with a case where the force has been directed and expended upon, or in the abdomen, where there is no external opening, the questions to be considered are: First, is the injury confined to the abdominal wall, and, second, have the intra-abdominal viscera escaped intact? When we have decided that intra-abdominal injury has taken place, we usually have two important conditions to deal with, viz., hæmorrhage and visceral laceration. Before we decide on the existence of an intra-abdominal injury we must first of all eliminate shock, a condition not infrequently following immediately after the accident. Shock without hæmorrhage and shock following hæmorrhage. Shock immediate and shock delayed—these are terms that carry with them confusion from which it is difficult to escape.

Shock in connection with our subject is almost solely a vaso-motor paralysis of reflex origin, from the peripheral sensory nerves, affecting the blood supply of the abdominal organs, more particularly the mesenteric venous

*Read at meeting Iowa State Association of Railway Surgeons, Clinton, October, 1898.

circulation. The individual bleeds into his own veins. The extremities and body surface are deprived of blood, the heart has a decreased volume to react upon and we have the appearance as seen after actual hæmorrhage. These reflexes usually are manifest immediately, gradually the vaso-motor contrictors become operative, the overburdened abdominal vessels become relieved, the general blood pressure is equalized, the symptoms of shock disappear. We may say shock without actual hæmorrhage. It is always an early manifestation. Delayed shock is nearly always due to hæmorrhage. We might say here that such expressions as the latter, and also shock following hæmorrhage, should be dropped from our nomenclature, because they are misleading, and we should speak of shock only when due solely to reflex conditions brought about by trauma. The condition brought about by excessive loss of blood would better be designated as collapse.

While shock occurs usually immediately after injury, and as a rule disappears in a relatively short time, we do occasionally, though rarely, meet with cases where we have shock and hæmorrhage combined, and we may find it impossible to separate the latter state from prolonged shock. For all practical purposes, however, we will see later that this last condition need not prevent us from serving the best interest of our patient.

Having eliminated the element of shock and decided that an injury of the abdominal organs has taken place, as practical surgeons it matters little whether we have a perforation or laceration of the hollow viscera or more solid organs, or destruction of blood vessels, the indications are plain.

Before we proceed further let us consider what structures may be injured, how and why. In this connection permit me to call your attention to the valuable researches of B. Farquhar Curtis. He found that aside from bruising and laceration of the parietal structures, there occurred in ten out of forty-four experiments on dogs, severe contusion of the intestine threatening perforation, most of them having laceration of some coats of the intestine. In ten cases no injury was done. In two cases the cæcum was separated from the ileum, rupturing branches of the mesenteric artery.

"Laceration of the mesentery, so severe as to deprive this part of the mesenterium of its blood supply, in thirteen cases. In one case there was laceration of the mesentery, causing such profuse hæmorrhage that life was endangered. The vessel was secured by ligature."

"Rupture of the intestine was caused in eight cases; in two cases there were two ruptures. Of these ten ruptures of the gut, four extended completely across it and two almost across; of the rest three were directed in the long axis of the gut."

As to the cause of rupture of the intestine permit me to refer you to the same excellent paper by Curtis on this subject.

From a series of experiments on the cadaver by him he draws the following conclusions:

1. In contusion of the abdomen the intestine is ruptured by being crushed between the contusing body and the bony parts and the vertebræ and pelvis. The injury is therefore not a true rupture, but a contused and lacerated wound of the gut.

2. Partial distention of the gut, especially if a large part of the intestine is distended, diminishes the danger of rupture. If great distention of an isolated loop ever occurred in life it would increase the danger of rupture, even for a loop not in contact with bony parts.

3. The most exposed position for the gut is in contact with the bony parts—in front of the vertebræ, near the brim of the pelvis (when hernia is present) and near the crest of the ilium.

4. There are many chances in favor of escape of the intestine from injury in contusion of the abdomen—there may be no gut lying directly at the point where the blow is inflicted, the gut may be partially inflated with gas or may slip away from the pressure exercised by the blow. This fact is of great importance in its bearing upon the question of early performance of laparotomy for rupture of the intestine.

The relative frequency of injury to different parts of the intestine would lead us beyond the scope of this paper. For our purpose we can dismiss this question with the assumption that that particular portion of the intestine is most likely to be damaged which lies immediately under the site of the blow.

The great danger from contusion or lacera-

tion of the intestine is peritonitis from the fecal extravasation. In cases of perforation or laceration, or perforation from localized gangrene, or the diminished vitality of the tissues which follow various organisms to penetrate them causes peritonitis.

Aside from peritonitis, hæmorrhage from laceration of the mesentery is the most frequent complication; it usually occurs from a rupture of one or more of the mesenteric blood vessels or the longitudinal intestinal arteries.

In my search through the literature upon the particular point of diagnosis, I found about fifty cases and from them I have attempted to make up the following symptomatology:

Shock, it was found, that, in varying degrees, was present in nearly three-fourths of the cases.

Consciousness was abolished in less than one-half of the cases.

Restlessness was noted in a small proportion.

Vomiting in the early stages is a common occurrence, and is noted in the vast majority; it was also a late and severe symptom in about one-half the cases. Besides the ordinary stomach contents, hæmorrhagic material was observed in the ejecta of a few cases.

Nausea is nearly always present, even in those cases where there has been no actual emesis.

Pain is an early and constant symptom in all cases, although it may be occasionally absent. The character of the pain will vary; it may be acute, lancinating, colicky, continuous or intermittent, and in severe injury grows worse; or it may be comparatively slight or even absent for two or three days, when it suddenly grows worse, which is usually a positive sign of perforation and the beginning of peritonitis.

Tenderness was present in nearly all the cases early and was of great diagnostic value in locating the seat of the injury in many cases. I have found the report of one case (MacLean) where the tenderness was practically absent after the first day, and yet death ensued, the autopsy disclosing a rent in the ileum which admitted three fingers.

Tympanites occurred early in a few cases and later in the majority, and in all of those where peritonitis supervened a few fatal cases were recorded where no tympanitis was noted at any time.

On percussion several cases of flat and "tense belly" are recorded which, by some authors, has been regarded as symptomatic of perforated gut; many cases of laceration of gut were found in which the above symptom was absent.

Liver dullness was reduced as soon as tympanites began; this reduced area of dullness has been regarded as indicative of intestinal perforation or rupture, but should not be too much relied upon.

Constipation is an almost constant condition, which is relieved in a day or two if the lesion has been slight, and is obstinate in direct perforation to the amount of intestinal injury, and in the fatal cases it was not relieved.

Fecal vomiting is not a constant symptom, occurring early in a few cases and late in a larger proportion. It is always a grave sign.

Temperature was found to be extremely variable, and was found of comparatively slight value except when subnormal or extremely high. As a rule the range of temperature was not great.

Pulse varied greatly, but often proved of great value. It frequently gave warning of hæmorrhage, and of peritonitis. A gradually falling temperature, with a slightly increasing pulse-rate, decreasing pulse volume, means hæmorrhage. A gradually rising temperature, increased pulse-rate, the hard wiry pulse at once suggests peritonitis.

Prognosis.—The average duration of life in the fatal cases has been found to be forty-eight hours. In some cases the shock never leaves the patient, but he slowly falls into collapse, followed by death. In cases of hæmorrhage and fecal extravasation, collapse and death may ensue in a few hours. When peritonitis develops, which often does, the outcome is nearly always bad. The prognosis is uncertain in that class of patients where the symptoms are vague, the suffering may be slight, the case apparently improving, but, to the surprise of everyone, the slight tenderness has gradually developed into peritonitis; our hopeful attitude has changed to a state of hopelessness.

Diagnosis.—To sum up the foregoing, we find that much depends on the nature of the blow, how and when inflicted, and by what

particular object. If the striking object is small, but hard, and applied with great force, and when inflicted at a point where the gut lies between the point of injury and a bony prominence like the vertebral column, or iliac bone, we are very likely to have rupture of the intestine. If the site of the blow is over the liver or spleen, or bladder, our chief attention must be directed to these particular organs. Whether or not these organs have been lacerated or are the seat of hæmorrhage, will depend upon such signs of internal hæmorrhage as are indicated by an increasing rate and diminishing volume of the pulse, with a gradual lowering of temperature, especially if these symptoms become manifest after consciousness has been restored, or, in cases where no unconsciousness followed the accident, and these symptoms supervene later.

It has been shown that four-fifths of the cases of contusion of the abdomen recover, yet every case should be observed closely for the first twelve to twenty-four hours. We have noted, in all the cases of recovery, the worst symptoms were observed immediately after the accident, but the improvement began in a short time and continued until complete recovery, some in a short time, others more slowly, exhibiting pain, fever, localized peritonitis, tenderness, vomiting, etc.

While shock is frequently present, it must not in itself be regarded as grave; as a rule, it disappears, but if long continued may end in death. We may be puzzled whether we have shock pure and simple, or whether we do not have hæmorrhage; whether the primary shock symptoms may not have so overlapped manifestations of exhaustion from hæmorrhage in such a manner that it will be difficult to state where shock ended and exhaustion from hæmorrhage began. Here the judgment of the surgeon sustains its severest test. Right or wrong may determine life or death. Restlessness is nearly always an indication of severe internal injury. Vomiting was present in nearly all cases, when taken together with other signs, and if long continued and persistent, means mischief. If the ejecta are feculent, which is not often, we must think of bowel obstruction or laceration. Vomiting, if not present early but coming on late, means peritonitis.

Bloody stools always mean bowel injury. Constipation is the rule which may be due to simple shock or the bruising of one or more intestinal coats or all, or to bruising of the mesenterium.

Retention of urine is not uncommon, and when due to laceration of the bladder may be serious. Bloody urine, whether passed voluntarily or per catheter, always means vesical or kidney injury.

The physical signs in abdominal contusions are usually important, and while they are sometimes misleading, yet they aid us in no inconsiderable degree when carefully considered in connection with other symptoms. Localized tenderness is always important and frequently points out the probable seat of injury, and is an indication as to the point of incision, should one become necessary. Tympanitic resonance or dull percussion sound in an unusual place is sometimes an aid. The two important conditions, however, to be sought after are intestinal rupture and hæmorrhage. If these can be excluded, we can afford to wait. If these two factors are absent the majority of our cases will progress to convalescence, which is usually complete.

Having decided that an intra-abdominal lesion exists, our way is now clear. The symptoms of shock, if any existed, having disappeared, our only recourse is to open the abdomen and repair the damages that exist. If an intestine has been lacerated, repair it. If contused so as to threaten its future integrity, resect it. If the mesenterium is torn, sew up the rent. If a bleeding blood vessel is found, ligate it. If a solid organ is injured, treat as indications demand. Whatever we find necessary to be done, we must never forget to first place our patient in the best possible condition. If shock has been present surround the case with artificial heat, strychnia in full doses hypodermically, intra-colonic injections of hot saline solution. If hæmorrhage has been severe we must not omit intra-venous saline solution. Upon these precautions often depends our success or failure. We should have everything at hand that may be needed, so that when the operation itself has begun we may proceed with all possible speed consistent with thorough work.

Do not cough or sneeze over the operative field.

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FORMALDEHYDE DISINFECTION OF PASSENGER COACHES.

When disinfection by formaldehyde gas was first introduced the means for generating it were various forms of lamps and autoclaves. It was soon found that some of these did not generate enough gas to be of any particular value, others evolved the gas in sufficient quantities but were expensive, cumbersome, and required considerable skill to manipulate them. To overcome these difficulties the Chicago Health Department, realizing the value of this form of disinfection, instituted a series of experiments which have led to a total abandonment of all forms of apparatus. The disinfectors of the department who fumigate some 1,200 premises annually are now furnished with a bottle of formalin (a 40 per cent solution of formaldehyde gas in water). Several sheets are hung up in the apartments to be disinfected and the solution sprayed over them (the cracks and windows having been sealed up) about 150 c. c. of the solution to each thousand cubic feet being used; the room is then left for at least four hours. "Control" cultures of various micro-organisms left in the rooms during the fumigation are entirely killed.

During the month of August twenty-four passenger coaches and one baggage car were fumigated in the same manner in Chicago; for various reasons; the results were equally satisfactory with those attained in house disinfection. The sheet process of disinfection by formalin has been adopted by the Pullman Palace Car Company, and a circular issued by the assistant general superintendent, Mr. E. A. Jewett, giving full directions. The sheet process offers several advantages that are not found in other methods suggested for disinfecting railway coaches and sleeping cars; it is inexpensive, a very simple apparatus is required, the work can be quickly done and a large number of cars fumigated in a day. The formalin does not injure any fabric nor metal, and the whole method seems to commend itself as a simple and cheap solution of the problem of disinfecting coaches exposed to diphtheria, smallpox, yellow fever or other contagion.

THE GERMAN CONGRESS OF RAILWAY PHYSICIANS.

This association, which recently met in Cologne, seems to go into hygiene more than the I. A. R. S. The arrangements at Cologne for sleeping quarters and day waiting rooms for the employes are recommended as models. The association declared that the duties of the railroad physician include the supervision, from a hygienic standpoint, of employe's dwellings and clothing, of their leisure hours and their waiting rooms, for the safety of the public demands a healthy mind and body in everyone connected with the operation of railroads.

For disinfectant purposes Graf's byrolin soap was recommended, as it is comparatively inexpensive. In some of the eastern provinces trachoma was reported to be disseminated by the car cushions.

M. Brähmer stated that the years of service of an engineer should be calculated double, for

few of them ever attain the twenty-five-year pension limit. The association emphasized the need of vacations each year for several weeks or longer, in proportion as the service is exacting and the employe is more or less aged.

Medico-Legal Notes.

Bones Can Be Introduced for Inspection of Experts.

In a malpractice case, where negligence was charged in the treatment of a broken leg, causing gangrene to set in and requiring an amputation of the leg, the court of appeals of Kentucky holds (Williams vs. Nally) that it was not improper to allow the bones of the fractured leg to be introduced for the inspection of the experts. It also maintains that the testimony of those not professing to be experts, with respect to the actual condition of the leg, was competent, because they spoke only of what they saw and knew, expressing no opinions. Nor does it think that it was improper to allow counsel for the plaintiff to incorporate into some of his questions quotations from medical works as part of his questions when catechising experts as to their technical knowledge. Finding no reversible error, it affirms a judgment for $750 against the physician, who, by the way, was sent by a justice of the peace to attend the case, under instructions to give his patient all necessary attention, but not to run the county to unnecessary expense.—Jour. Am. Med. Asso.

Conductors Can Employ Surgeons in Emergencies.

It is a mooted question whether or not a railroad company is responsible in any case for the contracts of an employe, and he having no express authority to make them, and if so, under what circumstances this liability attaches to it. However, the supreme court of Arkansas suggests that the weight of authority seems to sustain the doctrine that in case of an emergency the employment (of a physician for instance) by the highest railroad official present is the act of the company, and it will be liable for the value of services rendered to one in the employ of the company injured by the running of its trains. It says that it may be that it is the legal as well as the moral duty of the company, when an accident happens to a person in its employ, to do all it can to prevent an injury to its servants from having its worst consequences, just as it is its duty to do all it can to prevent the injury in the first instance, when informed it is impending. But whatever may be the reason, it is a case in which someone should act without delay, and the equities are in the idea that the employer is under a greater obligation to do so than anyone else, not otherwise bound. Yet the liabilities should not be extended beyond the exigencies of the occasion, and the extraordinary rule should be most strictly construed and applied with the greatest caution, and all conditions upon which it is based should appear in every case when it is applied. Upon these conditions the court affirms a judgment in favor of the physician, in the appealed case of the Ark. Sthn. R. Co. vs. Loughridge, it being of the opinion that the emergency under which the conductor acted in requesting the physician to go and see the injured man (meaning to attend him), a brakeman, was such as to make the act binding upon the company, the charge being reasonable.—Ibid.

Carriers.

Where the carrier negligently left open the car door and a passenger, in attemtping to close it, was thrown to the ground by a sudden lurch of the car, the injury was the logical result of the negligence, and hence the carrier was liable, although the lurch was the immediate cause of the injury. Denver & R. G. R. Co. v. Bedell (Colo. App.), 54 Pac. 280; Burrows v. Coke Co., L. R. 5 Exch., 67; Titcomb v. R. R. Co., 94 Mass. 254; Winship v. Enfield, 42 N. H. 197; Davis v. Garrett, 6 Bing 716; Scott v. Shepherd, 2 W. Bl. 892; City of Denver v. Johnson, 8 Colo. App. 384.

A statute making books of science or art presumptive evidence of facts of general notoriety or interest is held, in Union Pacific Railway Company vs. Yates (C. C. App. 8th C.), 40 L. R. A. 553, not to include medical works so as to make them evidence of the opinions or theories therein expressed. On the other hand, scientific works containing statistics of mechanical experiments and tabulations of their results, when recognized as standard authority and generally relied upon by experts in that field, are held, in Western Assurance Company vs. J. H. Mohlman Company (C. C. App. 2d C.), 40 L. R. A. 561, to be admissible to support the opinions of experts. With these cases is a note marshaling the authorities on scientific books and treatises as evidence.

Pullman Company Blamed for Consumption Contracted in a Car.

El Paso, Tex.—J. M. Edmonson, a prominent attorney of San Antonio, Tex., formerly of Dallas, has sued the Pullman Palace Car Company in the United States Circuit Court here for $15,000 alleged damages. The plaintiff's grounds for the suit are somewhat novel. He claimed that while journeying in a Pullman car from San Antonio to Denver he was

drenched with rain water through a hole in the roof while asleep in his berth. From the effects of the wetting he says he contracted a severe cold, which resulted in consumption.

Notices and Reviews.

"Diet For the Sick." By Miss E. Hibbard and Mrs. Emma Drant, matrons at two large hospitals in Detroit. 103 pages; board sides, postpaid, 25 cents. The Illustrated Medical Journal Company, Detroit, Mich., publishers.

This is the third edition of this handy and popular little bedside book. The recipes for sick dishes have all been tried and are those largely used by the Detroit hospitals, where the two contributors of them served as matrons. Added to these are various diet tables, as for anæmia, Bright's disease, calculus, cancer, consumption, diabetes, dyspepsia, fevers, gout, obesity, rheumatism, uterine fibroids, etc., as given by the highest authorities. The booklet is intended to be given to the family by the physician, and for such purposes one-half dozen will be sent, prepaid, on receipt of $1.

"A Text-book of Materia Medica, Therapeutics and Pharmacology." By George Frank Butler, Ph. G.,M. D. Second edition, revised; pp. 860. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Cloth, $4 net; sheep or half morrocco $5.

Dedicated to the "Medical Students of the United States," the text is arranged to suit their peculiar needs, and the early call for revision shows that the author has successfully met many questions that, unanswered, combine to render this one of the driest grinds of the student's days. The many theories of medicine are reviewd in the introduction and the "art of healing" is given as the dominating principle of them all. The definitions under Pharmacology and General Therapeutics are explicit and complete.

Classification of medicines raises the question that has caused much discussion, and the skillful reasoning by the author for their division into Disease-Medicines and Symptom-Medicines will satisfy many, but each man's experience will lead him to make his own classification later in his practice. Prescription and administration of medicines is well covered, especially from the student's point of view, this being a hard problem for him to solve, and one to which the average practitioner will do well to give more attention in the future. The tabular statement of the "Untoward Effects of Drugs" will be very valuable for purposes of reference and review.

A strong plea is made for the more general use of the metric system and the various systems of weights and measures are compared. Pharmaceutical preparations of the Pharmacopœia and National Formulary are treated briefly but thoroughly for the student. Each class of medicine is discussed thoroughly in the main portion of the work and the general arrangement of the articles commends it to all readers. Animal extracts are briefly presented in a practical manner and serum-therapy is well reviewed.

Disease-Medicines comprise restoratives, alteratives and antiseptics, the last division being especially well treated. Symptom-Medicines contain a large proportion of our more active preparations, and the physiological action which should be the basis for their use has been thoroughly considered and carefully compiled. The more important groups are Antipyretics, Anæsthetics, Hypnotics, Narcotics, Motor-excitants and Depressants, Cardiac Stimulants and Sedatives, Diuretics and Cathartics.

The work is well indexed and the general appearance keeps up the well-known quality of the Saunders publications.

J. A. PATTON.

"An American Text-book of Genito-urinary Diseases, Syphilis, and Diseases of the Skin." Edited by L. Bolton Bangs, M. D., and W. A. Hardaway, A. M., M. D. Illustrated with 300 engravings and 20 full-page colored plates. Royal Octavo. pp. 1228, Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898, Cloth, $7; half morocco, $8.

In this massive volume the well-known publisher has endeavored to present a combination of what would ordinarily be presented in two or three quite exhaustive text-books. The names of the well-known and justly popular men which appear as editors and, therefore, to a certain extent, sponsors for this work, afford a sufficient guarantee of its thoroughness, accuracy and authoritativeness.

In the department devoted to syphilis and genito-urinary diseases we find the following divisions and authors:

Urine Analysis, etc., Paul Thorndike; Dis-

eases of the Penis, B. Farquhar Curtis; of the Male Urethra, G. Frank Lydston; of the Testicle, etc., Eugene Fuller; of the Prostate, J. William White and A. C. Wood; of the Bladder, Edward Martin and A. E. Taylor; Vesical Calculus, Francis S. Watson; Diseases of the Ureter, Christian Fenger; Surgical Diseases of Kidney, P. R. Bolton; Functional Disorders, James Pederson; Acquired Syphilis, James S. Howe; Syphilis of Bones, etc., Lewis C. Bosher; Syphilis of the Circulatory System, et al., J. H. Linsley; Syphilis of the Nervous System, Graeme M. Hammond; Syphilis of the Eye, Thos. B. Pooley; Hereditary Syphilis, Abraham Jacobi; Treatment of Syphilis, Robert H. Greene, and Chancroids, James S. Howe.

In the department given to diseases of the skin we find:

Anatomy and Physiology, J. T. Bowen: Symptomatology, Charles W. Allen; Etiology, Pathology and Diagnosis, Douglass W. Montgomery, and Classification, by W. A. Hardaway.

Special articles are presented on the various affections by I. E. Atkinson, C. W. Allen, D. W. Montgomery, A. R. Robinson, J. M. Winfield, W. A. Hardaway, H. G. Klotz, M. B. Hartzell, J. Grindon, J. T. Bowen, J. A. Cantrell and E. J. Stout, F. J. Shepherd, C. W. Cutler, J. C. Johnston, S. Pallitzer, R. W. Taylor, J. A. Fordyce, I. Dyer, H. Tuholske, A. Van Harlingen, L. Heitzmann, G. T. Jackson, H. N. Lyon, W. T. Corlett and A. E. Regensburger.

From this extensive list of contributions much would naturally be expected and much is indeed found. The division of the work among such a large number of authors has naturally robbed the book of that uniformity and similarity of language and meaning which is characteristic of most good text-books. This can hardly be considered as a text-book, but rather a collection and compilation of a vast number of most excellent monographs on the extensive list of subjects which fall under the headings indicated in the title. The stupendous work of the editors has been performed in a most excellent manner and they deserve great credit for presenting the work in such a readable and systematic form.

The articles are too numerous for us to comment on their individual merits, but as a whole they are certainly excellent, being especially full and clear as to diagnosis and treatment, and expressed in language both terse and simple, thus making the book a readable and thoroughly practical treatise on these subjects.

We cannot refrain from expressing our inability to quite appreciate the advisability of combining so much in one volume, and especially of the subjects mentioned.

While the subjects were formerly combined in a specialty it is not the case now, and it is generally conceded that there is not sufficient in common among the two classes of diseases to warrant their being given special consideration collectively.

The purchaser of books is to be congratulated on the opportunity, however, to obtain so much in a single volume, and at a price but a little above what a complete treatise on any one division would cost.

The book will be an acceptable addition to this deservedly popular series of American Text-Books, for which the profession are particularly indebted to Mr. Saunders, who has been foremost in their publication. The book conforms in excellence of illustrations, typographical beauty and general make-up with the previous volumes of the series.

A. I. B.

"Treatment of Skin Cancers," by W. S. Gottheil, M. D., New York: The International Journal of Surgery Co. Price $1.00

The subject is treated in a practical manner, from the standpoint of the general practitioner as well as the specialists, and while every prominent modern method in the non-operative treatment of cutaneous cancer has received mention, the author elaborates especially upon the caustic method which experience has commended to him, and dwells upon the two essential points, recognition and treatment.

This book is printed upon heavy book paper, is substantially bound in cloth and profusely illustrated.

George F. Snow, the son of Dr. T. H. Snow of Baker City, Ore., accidentally shot himself and died instantly. The young man, who was only twenty years of age, was a student in his father's office, and with the latter attended the Toronto meeting.

Notes of Societies.

Programme of the Wabash Railway Surgical Association

The meeting will be held in the parlors of the Southern Hotel, in St. Louis, November 10, 1898.

President's Address, Dr. Geo. R. Highsmith.

"A Peculiar Trauma," report of case, by Dr. E. R. Lewis, Kansas City, Mo.

"Railway Spine," by Dr. J. W. Young, Bloomfield, Iowa.

"Laparotomy for Gunshot Wound of the Abdomen," by Dr. Joseph Pogue, Edwardsville, Ill.

Dr. Miles F. Porter, Fort Wayne, Ind. (Subject not given.)

"Operation for Complete Procidentia," by Dr. H. C. Howard, Champaign, Ill.

"Ligation of Left Subclavian Artery," by Dr. L. C. Armstrong, Taylorville, Ill.

Dr. W. H. Myers, Fort Wayne, Ind. (Subject not given.)

"Report of Three Cases of Fractured Skull," by Dr. H. C. Fairbrother, East St. Louis, Ill.

"Traumatism of Knee-Joint," by Dr. J. H. Baker, Salisbury, Mo.

Volunteer papers. Election of officers.

GEO. R. HIGHSMITH, M. D., Prest.
C. B. STEMEN, M. D., Secy.

Mississippi Valley Medical Association.

The following officers were elected at Nashville of the Mississippi Valley Medical Association: President, Dr. Duncan Eve, Nashville, Tenn.; first vice-president, Dr. A. J. Ochsner, Chicago, Ill.; second vice-president, Dr. J. C. Morfit, St. Louis, Mo.; secretary, Dr. Henry E. Tuley, Louisville, Ky., 111 W. Kentucky street; treasurer, Dr. Dudley S. Reynolds, Louisville, Ky. Next place of meeting, Chicago. Chairman of committee of arrangements, Dr. Harold N. Moyer. Time of meeting, October, 1899, date to be determined by the executive officers and the chairman of the committee of arrangements.

Surgeons Lehigh Valley R. R.

Wilkesbarre, October 5.—The surgeons of the Lehigh Valley Railroad concluded their annual meeting to-day. Dr. Biddle of the Ashland Hospital read a paper on injuries to the brain, and Dr. Brewster of Elmira one on amputation of the foot. The following officers were elected for the ensuing year: President, Dr. W. G. Weaver, Wilkesbarre; first vice-president, Dr. Johnson, Towanda; second vice-president, Dr. Hollister, Newark, N. J.; secretary and treasurer, Dr. Zern, Lehighton. The meeting next year will be held at Niagara Falls, N. Y.

New York State Medical Association.

At the annual meeting held in New York City at Mott Memorial Hall, October 18, 19 and 20, the following officers were elected: President, Dr. Joseph D. Bryant; vice-presidents, Dr. James G. Hunt, Dr. D. G. Moriarta, Dr. F. D. Reese, Dr. W. M. Bemus; treasurer, Dr. E. D. Ferguson; secretary, Dr. M. C. O'Brien; council, Drs. J. B. Sharer, C. E. Fritts, L. J. Brooks, De L. Rochester and Charles Dennison.

American Academy of Railway Surgeons.

The following are the newly elected officers: President, W. W. Grant, Denver, Colo.; vice-presidents, T. F. Pritchard, Manitowoc, Wis., J. P. Lord, Omaha, Neb.; secretary, T. B. Lacey, Council Bluffs, Ia.; treasurer, C. B. Kibler, Corry, Pa. Next annual meeting at Omaha, October, 1899.

Railway Miscellany.

Frank Palmer, traveling passenger agent of the Wisconsin Central, died last week at Milwaukee, Wis..

Charles B. Maxwell, traveling freight agent of the Union Pacific at Kansas City, Mo., died in that city October 15, at the age of 54 years. He had been connected with the Union Pacific for seventeen years and had been traveling freight agent at Kansas City for the past five years.

A French navigation company, Les Chargeurs Reunis, has decided to establish a steamship line between Havre and San Francisco, touching at various Mexican and Central and South American ports, and three new steamers, with a capacity of 6,000 tons each, are being constructed for the service. The first steamer will arrive at San Francisco next March.

The Boston & Albany Railroad prints across the top of its timetables, issued for the Springfield line, between Boston and New York, the following: "No Dust:—The attention of the traveling public is called to the progressive management of the Boston & Albany railroad. This company has sprinkled its tracks with oil, so that no dust is raised by the swiftly moving trains. No other railroad in New England has done this. Travel by the B. & A. and avoid one of the most uncomfortable adjuncts of a railroad journey." As previously noticed, the control of this sys-

tem of allaying dust on roadbeds has recently been acquired by the Q & C Company of Chicago.

Frank L. Doran, engineer and general roadmaster of the Chicago & Western Indiana, died at his residence in Chicago October 15, at the age of 49 years. He was born at Milton, Ind., Jan. 2, 1849, and received his education as a civil engineer at Earlham College at Richmond, Ind. He was for several years in the service of the United States on surveys for the Hennepin Canal and other important works, and had been engineer and general roadmaster of the Chicago & Western Indiana for a number of years.

The board of railroad commissioners of Massachusetts last week held a conference with the master mechanics and superintendents representing the leading railroads of the state, relative to a division of the regulations pertaining to the construction of locomotive boilers. A number of amendments have been suggested by the railroad companies. The regulations were the outgrowth of a number of locomotive boiler explosions that took place some years ago, on account of which the legislature authorized the commission to formulate regulations and gave it the power to make changes when necessary.

The Superior Court of California has ruled that the railroad commission of that state has no jurisdiction over street railways. The commission proposed to fix a schedule of fares for the street railways of San Francisco and made application for a writ of mandate to compel the Market Street Railway Company, which is controlled by the Southern Pacific, to produce its books for examination. In dismissing the application, Judge Sewell holds that the term "railroad" in the statute does not refer to street railways in the true meaning of the word, and that, although the commission is empowered to fixe the rates for carrying freight, the law does not imply the power to fix passenger rates, and that any other interpretation would involve the carriers of passengers and freight by coach and baggage companies. Judge Sewell holds that only municipal authorities have the power to fix the rates of street car lines. It is stated that the case will be appealed to the Supreme Court.

William B. Snow, formerly for many years master mechanic of the Illinois Central, died at his home in Chicago, October 21, at the age of 77 years. He was born at Bellows Falls, Vt., Feb. 13, 1821, and entered railway service in September, 1844, as foreman of repairs of bridges and buildings of the Western Railroad of Massachusetts. From September, 1847, to December, 1848, he was car builder in the shops of the same road at Springfield, Mass., and was then until June, 1850, car builder for Tracey & Fales at Hartford, Conn. In June, 1850, he accepted a position with the American Car Company at Seymour, Conn., as foreman of passenger cars, and remained with that company for several years. He went to the Illinois Central in March, 1857, as general foreman of car works, and held that position for fifteen years. From 1872 to Jan. 15, 1875, he was traveling mechanical inspector for Pullman's Palace Car Company, and on the last named date returned to the Illinois Central as master mechanic, which position he held until 1891.

James Tillinghast, formerly for many years general superintendent and assistant to the president of the New York Central & Hudson River, died at his residence in Buffalo, N. Y., October 25, at the age of 76 years. He was born at Cooperstown, N. Y., May 8, 1822, and began his railway career in 1850 as a fireman on the Utica & Schenectady, now a part of the New York Central system. From October, 1851, to April, 1856, he was master mechanic and assistant superintendent of the Rome, Watertown & Ogdensburg, and from the latter date to April 1, 1864, superintendent of motive power and assistant general superintendent of the Toronto Northern. He was then for a few months master mechanic of the western division of the Michigan Southern at La Porte, Ind., and in July, 1864, was appointed general superintendent of the Buffalo & Erie, which position he held until Feb. 8, 1865. On the latter date he went to the New York Central & Hudson River as superintendent of the western division, and was appointed general superintendent on Jan. 1, 1869. He held the latter position until 1881, when he was made assistant to the president. He retired from active work about 1886, but continued to hold the title of assistant to the president until January, 1889.

The Pullman Decision.

The Illinois Supreme Court on October 24 rendered a decision adverse to Pullman's Palace Car Company in the suit of the attorney-general of the state to determine whether the company had exceeded the rights of its charter in building and owning the town of Pullman. The suit was brought some four years ago in the Circuit Court of Cook County, where on demurrer the case was thrown out of court. An appeal was taken to the State Supreme Court, which in brief holds that the charter of the company did not clothe it with power to purchase the real estate upon which the town or city of Pullman is built, or to construct the buildings in said town or city, or to engage in the business of renting dwellings, storerooms, market places, etc. It holds

that it may not own stock in the Pullman Iron & Steel Company, but that it may sell liquors to the passengers on its cars. It may properly own the Pullman building in Michigan avenue, in which the general offices are located. It may properly own twenty-five acres of land near the Belt Line Railroad for the reception of its cars, and it may properly furnish power to the Allen Paper Car Wheel Company. The main part of the decision relates to the rights of the company to own the town of Pullman and is as follows:

"Our interpretation of the law, as applied to facts appearing from the averment of the pleas, is that the appellee corporation, at and before the time of the filing of the information, was exercising power and performing acts not authorized either by the express grant of the charter or any implication of law, and, further, that by some of such unauthorized acts the corporation assumes and exercises powers and functions which the general law of the state contemplates shall be possessed and exercised only my municipal authorities of cities or towns and the public school authorities, and that other of its unauthorized acts tend to restrain competition in various branches of trade, to remove real estate from the operation of our statute of descent, and place the title thereto in a corporation having perpetual succession and unending existence, and thereby withdraw it from the channel of trade and commerce; to create monopolies in the business of selling the necessaries and comforts of life, and that its acts and doings are opposed to good public policy. We do not think the demand that usurpations so clearly antagonistic to good public policy shall be restrained can be defeated by any imputations of laches, or upon the ground that acquiescence is to be inferred from the failure to invoke the aid of courts at an early day."

The judgment of the lower court is reversed and the cause remanded with directions to proceed further in conformity with the opinion. A dissenting opinion was filed by Justices Cartwright, Craig and Wilkin.

Power From Car Axles.

The introduction of the axle electric light system in the service of the Atchison, Topeka & Santa Fe Railway running between Chicago and Los Angeles marks a radical departure from previous practice, which necessitated a large electric light plant in the baggage car.

The power under the new system is taken from the car axle. The leading features of the apparatus consist of a dynamo operated from the axle and a storage battery which supplements the direct work of the dynamo in operation, as, for example, when the car is at rest or moving at a slow speed.

The belt which connects the driving pulley with the countershaft and dynamo pulleys is made of camel hair. It is eight feet eleven inches long and three and one-half inches wide, and is the only kind of belt that will stand the varying effects of rain, snow and ice and which will adapt itself to all conditions. Though not an endless belt it is made practically so by an upturned joint clamped between steel washers in such fashion that no metal whatever comes in contact with the pulleys.

The dynamo is of a high grade of construction and the brushes are good for 30,000 miles. Conductors and brakemen can operate the switchboard, so that no skilled labor or electricians are required on the train.

The low operating expenses are the main features claimed for this system. While the cars are running the light is taken direct from the dynamo, and when standing still or going at less than eight miles an hour the light is automatically taken from the storage batteries. At all times the lamps are steady and brilliant.

There are four trains in the Santa Fe limited which run from Chicago to Los Angeles. Each of these trains is equipped with an observation compartment car, three sleeping cars and a dining and library car.

The equipment includes lights in all the berths, making this the first train in the world carrying such a large supply of light service exclusively from the car axles. When the intention of lighting the locomotive headlight from the same service is carried into effect the four trains will be solid axle light trains throughout.

The system mostly in vogue, of lighting a train from one large plant in the baggage car, has many objectionable features. If the car carrying the plant meets with an accident or the plant itself gets out of order, the entire light output of the train becomes deranged. In the axle light system each car has its own little plant, compact and complete, with its dynamo and storage battery. Actual measurements demonstrate that after the round trip to Los Angeles of over 4,500 miles, and after supplying the cars during six nights with brilliant light, the storage is as full as it was at the start. If one car becomes crippled in any manner it can be lighted from an adjoining car until a terminal is reached, where the necessary repairs can be made.

The National Electric Company of New York, which has introduced the light, has been perfecting its system for ten years. The first contract in the West was made with the Santa Fe company, and the unqualified success of the experiment induced the Pullman company to introduce the light in all of its cars on this route.

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INJURY AND DISEASE—A CLINICAL STUDY.*

BY GILBERT GEOFFREY COTTAM, M. D., ROCK RAPIDS, IOWA.

It is the purpose of this paper to comment briefly upon the difficulties which confront the surgeon in his efforts to analyze the symptom-complexes of personal injury cases. My incentive to select this theme is the scant attention accorded to it in literature and a series of personal experiences which convince me that no more intricate task exists than that of making a clinical separation of the symptoms actually due to the injury itself and those due to pre-existing disease, especially when the field of investigation is still further obscured by the presence of a third, the neuro-psychopathic, element. Many times more difficult is this task when months or years have elapsed since the injury and Time has had ample opportunity to infuse new factors in the shape of pathological processes wholly independent of the original injury, yet strikingly resembling some of the remote consequences which we would reasonably expect to accrue from the injury.

To begin with, the medical investigator is in a peculiar position. He must eliminate all bias from his mind and judge his case from an entirely impartial standpoint. He is paid by one or other of the parties involved, either the railway company or the claimant, yet this must not obligate him to make his conclusions harmonize with the claims of the side which employs him. The moral responsibility is great in these cases. Where the examination is agreed upon for the purpose of assisting a settlement without litigation the examining surgeon practically becomes an arbitrator in the matter, for the settlement is apt to be made upon the basis of his report. Therefore, I repeat, his position is peculiar.

It almost goes without saying that such an examination must be most thorough, both to protect the surgeon and to do justice to claimant and company alike. The family and personal history must receive careful attention to elucidate such questions as these:

1. Did such and such a morbid condition exist prior to the injury, if so (a) was it aggravated by the injury, or (b) would it have become worse regardless of the injury?

2. Was it directly caused by the injury or did it result from other conditions brought about by the injury? Or

3. Did it set in since, from causes wholly unconnected with the injury?

4. How will it affect the prognosis?

The paramount importance of getting these points established is revealed when we realize the close relationship of trauma and disease. Perhaps I can illustrate my meaning best by citing a few specific examples.

Pernicious anæmia due to shock is described in detail by J. B. Herrick (1). A patient, a woman of 63, of good appearance, and weighing 137 pounds, was an active practitioner of medicine. Her family history was good. She was married and had five children. She fell on a sidewalk, hurting her back and left side extensively. After this she became physically and mentally weaker. Soon her legs began to swell, dizziness and faintness developed, pallor was noted, and she was confined to bed a large part of the time. She was suspected of malingering, but this could scarcely be proved. Later physical examination showed signs of pernicious anæmia, numerous retinal hæmorrhages, cardiac murmurs; the blood was pale, the corpuscles varying greatly in size, a few containing nuclei—most of these being normoblasts. The leucocytes were increasing relatively, and there

*Read at meeting of Iowa State Association of R. R. Surgeons, Clinton, October, 1898.

1. Alienist and Neurologist, July, 1896.

were many lymphocytes. Red corpuscles, 666,000; hemogoblin, 25 per cent; the temperature varied from 97 to 102. The case then passed from his notice.

Gout is about the last disease which one would expect to have associated with trauma, yet Cornillon (2) reports a case that appeared after dislocation of a shoulder-joint, another after severe muscular effort, and a third three months after severe contusion. He believes that the injury was the direct cause of the development of the disease.

Trauma is an important factor in the production of tuberculosis, not only of the arthritic but also of the pulmonary variety. Mendelsohn, quoted by Osler (3), reports nine cases in which, without fracture of the rib or laceration of the lung, tuberculosis developed shortly after contusion of the chest. B. Schuchardt (4) describes a case in which a blow on the lumbar region was followed by neurasthenia and latter by pulmonary tuberculosis.

Addison's disease may owe its origin to blows upon the abdomen (5), and this is in keeping with the theory that a lesion of the sympathetic system (6) is responsible for the disease.

While there is no specific traumatic heart disease, as pointed out by Bernstein (7), there may be rupture of the heart-muscle or valves resulting ultimately in a lesion which cannot be differentiated from that due to rheumatic endocarditis except by close scrutiny of the past history of the case.

Appendicitis is a disease more commonly induced by trauma, I believe, than is generally admitted. This may occur in several ways, external contusion being one as in a case related by Coley (8), in which a boy of 16 years was struck in the right iliac region by the handle of a push-cart. Operation three days afterward discovered a gangrenous appendix. Internal strain is another traumatic cause of appendicitis, the actual injury being probably inflicted by sudden psoas contraction, as suggested by Robinson. Such a case occurred in my observation last month. A previously healthy girl, aged 14, was suddenly taken with a severe pain in the right iliac region after doing some violent work in the harvest field. She immediately went to bed, and her parents, two days afterward, sent for the family physician, who treated her with colon-flushings of potassium permanganate solution, and Epsom salts by the mouth. No amelioration taking place by the fourth day, I was sent for with a view to operation. On making McBurney's incision I found a gangrenous appendix, bathed in pus. Removal of this and thorough drainage brought about recovery.

Post-traumatic pneumonia, pleurisy, and delirium tremens are relatively frequent, as are other acute affections which need not be considered in this connection.

I will read you the condensed report of a case which embraces most of the points which I have tried to bring out in the foregoing expressions. This man was traveling on an M. K. & T. passenger when run into by a Gulf, Colorado & Santa Fe freight at a crossing. He declined immediate settlement, filing a claim for $10,000 against the latter road about a year after the collision. The company offered to settle for $2,000, but this was refused. Claimant then threatened litigation but agreed to submit to a physical examination by a surgeon designated by the company before commencing suit. I was appointed to make this examination, with the stipulation that, although employed and compensated by the company, I should act in an absolutely impartial capacity. This I did, incorporating my observations in the following report:

A. B. C..... Age.....43. Lawyer.

Height....5 feet 8⅜ inches. Weight (without clothing)....136½ pounds.

Family history: Father died of sequelæ of rheumatism, aged 74; mother died in parturition. Grandparents all died in advanced age. Has five sisters living, ages 36, 33, 31, 29 and 23; none dead. One brother died at the age of 35 of acute nux-vomica poisoning. Has three brothers living, ages 39, 27 and 25.

Personal history (prior to July 2, 1897): States that he has been free from either constitutional or grave acute disease. Has suffered somewhat from dyspepsia and hemorrhoids for several years. Denies alcoholic

2. Am. Year-Book of Med. and Surg. (Gould), p. 93, 1898.
3. Pract. of Med., p. 213.
4. Viertlj. ger. Med., Supplement, 1897.
5. Ann. and Analyt. Cycl. Pract. Med. (Sajous), Vol. I, p. 141.
6. Pract. of Med. (Tyson), p. 713.
7. Zeit. f. klin. Med., Bd. XXIX, H. 5 and 6.
8. Med. Record, Vol. XLIX, p. 248.

excesses, but has reputation of indulging to excess at times.

Personal history (including and since July 2, 1897): I give this in his own words: "Was injured July 2nd while in the smoking department of sleeper on northbound M. K. & T. train. Was sitting at time of collision on west side of car looking out towards the west of town. Was unconscious of any danger when car was struck. I got the full benefit of a "short haul" from west to east side of car. When I recovered found my left foot, hands and head on top of the washstand, my right foot on floor. My left knee was sprained, continued to pain for a few days and has since been weak and "cracks" when flexed. It gives way at times and seems unable, alone, to support weight of body. My back aches continually, likewise the back of my head; this has existed since the accident. For a considerable time since the accident I was troubled with costiveness of the bowels and retention of urine; also had fainting spells, but not lately. Have felt dizziness for several months, especially on rising suddenly. Have a deep-seated ache in abdomen and sensation in abdomen as though it was divided in the middle, up and down. If I get up suddenly and attempt to turn to left I am frequently stopped by a sudden catch in my back in the lumbar and sacral regions which renders me unable to move. My back feels as though a sugar scoop was inserted through my back in said regions and extended downwards inside the pelvis. My legs suffer from cold sensations, especially at night when lying down, and am frequently awakened by a sense of someone pulling me out of bed by a strap around my body just above hips. I have no energy and legs are weak and heavy. Feel numbness of legs, especially when awakening or after lying down. Have to pound and rub legs to restore sensibility."

Physical examination: General muscular development good but lacking in tone; adipose fairly abundant, nowhere excessive. Skin free from eruption and normally moist. There is some tendency to venous varicosity, especially of lower extremities. Skin capillaries of face congested. Slight bilateral ptosis. Tongue coated, light brown fur at base and sides. Chest broad and well formed. Abdomen protuberent below umbilicus. No lesions of bones or joints discovered except a roughened condition of the external surface of the right olecranon, and a displacement or abnormal mobility of the semilunar cartilages of the left knee-joint. Gait slow and devoid of elasticity.

Chest measurement .....36½ in.
Forced inspiration .....37½ in.
Forced expiration .....34 in.
Right half of chest at nipple.....18½ in.
Left half of chest at nipple.....18 in.
Abdomen at umbilicus.....30½ in.
Mid-thigh circumference (right and left) .....18½ in.
Calf circumference (right and left)....14¾ in.

Comparative measurements of both lower extremities show no difference between them at any point.

Pulse (sitting) ..... 96.
Pulse (standing) .....104.
Respiration ....22.

Ten minutes after mounting flight of stairs and exertion of removing clothing:

Pulse (sitting) .....111.
Pulse (standing) .....119.
Respiration .... 32.

Quality of pulse, tension subnormal; rhythm, regular.

Auscultation and percussion of both lungs negative. Area of cardiac dullness somewhat enlarged. Precordial area slightly bulging. No apex beat to be detected externally by sight or touch. There is a visible impulse just below the ensiform cartilage. Both sounds of heart are lacking in intensity and sharpness of definition, the second especially so. Area of liver dullness slightly enlarged. Tenderness on pressure. Spleen normal to palpation and percussion.

Condition of reflexes:

Pupil responds to accommodation and to light.

Knee jerk normal.

Achilles tendon reflex normal.

No ankle clonus.

Abdominal reflex absent.

Cremasteric reflex normal.

Tactile sensibility—can recognize points of æsthesiometer as two points at the following distances:

Back .....65 millimeters.
Thigh .....75 millimeters.
Leg .....40 millimeters.

Sense of pain (pin-prick test) unimpaired. I can detect no areas or points of anæsthesia

or hyperæsthesia, either superficial or deep-seated. Spinal column normally mobile and free from irregularity of contour.

Ophthalmoscopic examination of right fundus, under homatropine, reveals no abnormality.

Urinalysis of two samples taken on different days:

Sp. gr. 1,022.

Reaction, slighly acid.

No albumin.

No sugar.

Triple phosphates slightly increased.

This examination occupied portions of five days, enabling me to observe the claimant under conditions of rest and exhaustion, excitement and tranquility, when complaining of excessive pain and when comparatively easy. He was an inordinate user of tobacco and a spasmodic drinker to excess. From the time of the accident to the following February—a period of seven months—he was subjected to extraordinary strain by reason of having to take care of an invalid wife, frequently lifting her and ministering to her many wants day and night. At the same time he was under the mental strain of looking after a large law practice.

Summing up, the following conclusions seem to me to be reasonable:

(a) That there is a wide disparity between the subjective sensations mentioned in C.'s statement and the objective symptoms developed by the examination.

(b) That there is no physical evidence whatsoever of either impairment of the functions of the spinal cord or of lesion of the adjacent structures.

(c) That the sensations described by C., whether intended to or not, do not point to injury of the cord.

(d) That the furred tongue, engorged facial capillaries, dyspepsia, liver enlargement and tenderness and hemorrhoids indicate chronic gastro-intestinal derangement, in part accounting for the loss of weight which he states has taken place, and the pain which he suffers.

(e) That the symptoms enumerated in the last paragraph would account for a considerable degree of nervous depression, inducing a hyper-sensitiveness of the imagination and keeping a patient's attention riveted upon himself and his ailments.

(f) That the heart is dilated and irritable (nota bene, the owner uses tobacco frequently and alcohol spasmodically). The dizziness, headache and numbness of extremities are traceable to circulatory disturbances.

The final adjustment of this case was in accordance with the foregoing deductions. Settlement for a sum similar to that originally offered by the company was effected without litigation, and, with the aid of freedom from worry, rest and change of climate and scenery, the claimant has been restored to a fair degree of health.

MEDICO-LEGAL ADDRESS.*

By Judge Walter I. Hay, Clinton, Iowa.

When I received an invitation to make an address to the Iowa Association of Railway Surgeons, I felt that I must not decline, and there were two reasons therefor that at once suggested themselves to me. First, I felt that I ought, as a citizen of Clinton, to do anything in my power that might make your visit here pleasant or profitable, and that I should contribute my mite to this end. Then I felt that there was a sort or affinity between the so-called learned professions, and that I, as a lawyer, owed a sort of brotherly obligation to the surgeons, and that I ought to respond to their call at any time. But in thinking of this phase of the matter I could not help moralizing a little and thinking at what a disadvantage my profession stood as compared with the others, the medical and the ministerial. In your profession your mistakes are behind you, and frequently, if not generally, all complaint is hushed. In the ministry, their mistakes, if any, are ahead of them and are only discovered, if at all, when it is too late to communicate complaints to human ears, while with the unfortunate lawyer his work is in the present and in the full light of day and his results are open to the observation of all and his mistakes are visited upon him in ways that the physician cannot heal or the minister solace. I observe that I am down to make a Medico-Legal Address, and turning to the dictionary I find that this expression means

* Delivered at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

law as affected by medical facts, and I suppose it can be transposed and mean medical and surgical practice or science as affected by the law.

We all know that we are a good deal thrown together in our respective professional duties. Occasionally we have to prosecute or defend some unfortunate surgeon for alleged malpractice, but more generally we meet in court in the trial of cases that call for expert medical and surgical testimony. While necessarily the surgeon is environed by law in his practice and encircled by restraints in his professional doings the high character now so generally attained in the profession by its regular practitioners makes criminal prosecutions exceedingly infrequent, and the same reason make civil damage suits against them very rare.

So far as civil liability is concerned all that is or should be required is that the physician or surgeon exercise reasonable and ordinary care and diligence and have the skill usual among his profession. The only matter of interest in this regard, and that is not of any special interest to the profession, but rather abstractly, or generally, is the liability of empirics, or those that pretend to heal by charlatanry, quackery or supernatural power, as by Christian Science, faith cure, etc., and here certainly the law not only should not, but does not, afford protection ot those that knowingly seek such aid, and all that should be or is required is that the practitioner use the means professed and that he be guilty of no deception that should deceive ordinary intelligence. If he professes to heal by prayer all that should be required of him is to pray. In this case the practitioner will then be all right; but think of the patient! However, a distinction to be drawn is, that if ability to heal certain maladies is professed the skill ordinarily used by those that treat the particular malady is required, and this is right.

The rise of the profession to its present high and enlightened standard has been through graduations and has taken time, labor, study and practice. The surgeons were formerly the barbers, and in primitive times the two callings were joined. This advance has brought with it enlarged responsibilities, as this is measured by this advancement and the state of medical and surgical science at the time and place. I do not imagine, however, that there is any shrinking on this account on your part.

The law recognizes no particular system of medicine, and, under any system of government like our own, could not well do so, and the degree of skill, care and diligence required is to be tested by the standard of the particular system professed. This makes every patient a free moral agent, allows him to choose, but gives him no right to demand any more than he bargained for. As illustrating the state of the law upon this subject and incidentally showing how the law regards it and why, I will quote from the opinion in a New York case: "The legal signification of the term 'doctor' * * * means simply a practitioner of physic. The system pursued by the practitioner is immaterial. The law has nothing to do with the merits of particular systems. Their relative merit may become the subject of inquiry when the skill or ability of a practitioner, in any given case, is to be passed upon as a matter of fact. But the law does not and cannot supply any positive rules for the interpretation of medical science. It is not one of those certain or exact sciences in which truths become established and fixed, but is essentially progressive in its nature, enlarging with the growth of human experience, and subject to those changes and revolutions incident to any branch of human inquiry, the laws of which are not fully ascertained.

"The labors of the anatomist, the physiologist, and the chemist have contributed an immense storehouse of facts, but the manner in which this knowledge is to be applied in the treatment and cure of diseases has been, and will probably continue to be, open to diversity of opinion. No one system of practice has been uniformly followed; but physicians, from the days of Hippocrates, have been divided into opposing sects and schools. The sects of the dogmatists and the empirics divided the ancient world for centuries, until the rise of the methodics, who in their turn gave way to innumerable sects. Theories of practice believed to be infallible in one age have been utterly rejected in another. For thirteen centuries Europe yielded to the authority of Galen. He was implicitly followed, his practice strictly pursued. Everything that seemed

to conflict with his precepts was rejected, and yet in the revolutions of medical opinion, the works of this undoubtedly great man were publicly burned by Paracelsus and his disciples, and for centuries following the medical world was divided between the Galenists and the chemists, until a complete ascendency over both was obtained by the vitalists. This state of things has been occasioned by the circumstance that medical practitioners have been often more given to the formation of theories upon the nature of disease, and the mode of its treatment, than to that careful observation and patient accumulation of facts by which, in other sciences, the phenomena of nature have been unrivaled. * *

"It is not to be overlooked that as an art it has been characterized in a greater degree by fluctuations of opinion as to its principles and the mode of its practice than perhaps any other pursuit. That it has been distinguished by the constant promulgation and explosion of theories. That it has alternated between the advancement of new doctrines and the revival of old ones, and that its professors in every age have been noted for the tenacity with which they have clung to opinions and the unanimity with which they have resisted the introduction of valuable discoveries. They still continue to disagree in respect to the treatment of diseases as old as the human race; and at the present day, when great advances have been made in all departments of knowledge, a radical and fundamental difference divides the allopathists from the followers of Hahnemann, to say nothing of those who believe in the sovereign instrumentality of water. In fact, nothing comparatively is known as to the philosophy of disease. Its eradication or cure, where the result of human agency, is in the great majority of instances attributable rather to the careful observation, judgment and experience of the particular practitioner than the application of general or established methods available by all. The popular axiom that doctors differ is as true now as it ever was, and as long as it continues to be so, it is impossible for the law to recognize any class of practitioners or the followers of any particular system or method of treatment as exclusively entitled to be regarded as doctors."

It may be well to remark here, incidentally, of course, that it has been held that where a physician is sued for malpractice, the fact that he has not presented his bill may be used against him and might have great force. This should remind you all that the old and time-honored custom among physicians of vigorous charges and prompt collection should not be allowed to go into disrepute. It seems to contribute toward safety as well as comfort and pleasure.

I have already stated that our professions meet professionally, most generally, from the medico-legal standpoint, in the actual trial of causes that call for expert medical testimony. This field is necessarily large, as physicians and surgeons are continually called to so testify in court as to injuries, symptoms of disease, causes of death, insanity, etc., in both civil suits and criminal prosecutions, and consequently this branch of the relation of the law to your profession is more interesting than any other.

It by no means necessarily follows that a man has to be a physician or surgeon to testify upon any of these matters, for the law recognizes that legally competent opinions may be given, their weight, of course, to be determined by the jury, by one qualified by study without practice; or by practice without study, and profession of any kind is not an essential. However, the rule is practically universal to call actually practicing physicians and surgeons upon these questions. It may be stated as a general proposition of law that the testimony of experts is entitled to the same credit, is to be tested by the same rules as are applied to the evidence of other witnesses, and should have weight according to their value, as measured by intelligence, opportunity, qualification and reasonableness. Still there is an undoubted tendency both with juries and courts to give less and less weight to so-called expert testimony. In this loss of confidence in this class of testimony medical testimony has suffered with the other classes, and to a considerable extent, and probably from the fact of the contentions of the different schools of medicine, from the fact that it is an advancing science and so continually subject to change, and all who are legally competent are not equally advanced, in addition to distrust of mere opinion, which it has been said can-

not be reached or restrained by the penalties of perjury.

Judge Christiancy, in a Michigan case, said: "We consider it too well settled to require the citation of authorities, that upon questions of this kind, the opinions of men skilled in that particular science, in other words, physicians, are admitted in evidence, though not founded upon their own personal observation of the facts of the particular case. But if the question had not already been closed by authority, I should be much inclined to doubt the propriety of receiving the opinions of merely medical witnesses, under such circumstances, to anything more than physical facts, such as the physical effects of the disease, as I think it may well be doubted whether the skill of ordinary physicians in metaphysics or their judgment upon merely mental manifestations has been shown by experience to be of any greater value than that of intelligent men in other departments of life. The question, however, seems to be settled in their favor upon authority." And this probably fairly represents present judicial opinion.

There should be a remedy for this. It has been suggested that it lies in having expert witnesses selected by the court rather than the parties, when they would not be partisans of their employer, and presumably would be selected on account of their qualifications rather than from zeal in the cause of the party that employed them. I think this remedy lies with you rather than with the law, and that it is rectifying and will rectify itself in the advance of medical science and in the high standards of attainment and character now required for recognized and successful practice in your profession.

I believe that the great state of Iowa excels in its medical profession, as in most everything else, and I know that you, gentlemen, here stand as worthy representatives of your great calling in this state, and I trust that your meeting here may be pleasant and successful and that through it you may be better able to grapple with the ills that afflict mankind, and to uphold the high standard you have made for yourselves as physicians, surgeons and citizens.

Gauze, soaked in 3 per cent to 5 per cent warm carbolic acid solution, makes a most soothing and efficient poultice.

THE ANTISEPTIC TREATMENT AND DRESSING OF SEPTIC WOUNDS BY THE SURGEON IN CASE OF EMERGENCY.*

By D. P. Miller, Sudbury, Iowa.

The antiseptic treatment and dressing of septic wounds by the surgeon in a case of emergency. No other subject has occupied surgeons to such an extent during the past decade as has this subject, for it includes our modern antiseptics, as well as formulating the procedure and management of wounds caused by accident by which the railway surgeon is sure to be confronted.

It is not the object of this paper to point out the benefits derived from antiseptics, but rather to convey a few ideas of kinds and methods of using them.

The most universally valuable and available antiseptic is heat. A temperature of 140 degrees F. for ten minutes is fatal to all pathogenic bacteria except the tubercle bacillus and anthrax spores, which require a moist heat of 212 degrees F. for at least four minutes. Moist heat is far more efficient than dry, and for this reason as well as the convenience of application, heat is usually applied as an antiseptic to wounds by means of heated water. Water is aseptic at 42 degrees C., for it prevents the development of germs, and at 80 degrees C. (176 degrees F.) it kills microbes, at 55 degrees C. (122 degrees F.) it is a weak antiseptic. Some writers of high authority use water at 50 degrees C. during operation, since it has the advantage of not shrinking the tissues and carries off the detritus and clots and at the same time is hæmostatic. Water at 55 degrees C. (131 degrees F.) acts favorably on atomic wounds and hot water irrigation favors rapid cicatrization.

Of antiseptic drugs we have a large variety. Among the first to be chosen by most surgeons are: Carbolic acid, bichloride of mercury, biniodide of mercury, iodoform, boric and salicylic acids, etc., the use of which is too well known to dwell upon at this place.

More frequently in emergencies the surgeon is called to places where their methods are impracticable for the first dressing. For ex-

*Read at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

ample, on the road or in a shop, or any place where the person injured may be covered with dust and dirt from his surroundings. Now the surgeon's first thought is (if there is not much hæmorrhage) to keep the wounds as clean as possible, while the hæmorrhage itself is aseptic and is nature's own way of throwing out poisonous substances should there have been any passed at the time the injury was sustained.

Place a temporary dressing and take patient to the nearest place convenient where some suitable method of cleansing can be applied. This having been accomplished, the wound should be thoroughly washed and irrigated with a solution of carbolic acid 1-40. I prefer carbolic acid to other antiseptics here from the fact that it is more fatal to pathogenic water in general than is any other antiseptic. It penetrates well into the epidermis and mixes readily with fatty substances, which is not the case with corrosive sublimate, etc. I prefer this same solution, also, for cleansing the hands and instruments prior to operating. After the wound has been thus treated and all foreign matter and dead and dying tissue removed, its surfaces should be brought together by means of sutures if it be one of the class requiring sutures.

We have next to consider the dressings. If the wound is one capable of union by first intention we prefer a dry dressing, dusting the part freely with iodoform, or, better still, the preparation known as Senn's dressing, and covering with antiseptic gauze, absorbent cotton and bandage. Iodoform should be sterilized by heat before using. In the absence of any untoward sysmptoms this dressing should not be disturbed for several days.

One writer says fatty substances have been objected to as being irritating as well as being vehicles for infectious germs, also preventing union by first intention, and being incompatible with the idea of asepsis. In my own experience all derivatives of paraffine or vaseline are not irritating.

I believe it is too much the custom of the practitioner to treat granulating wounds like those capable of union by first intention. Very often these wounds are more or less inflamed, and when covered with gauze bleed at every dressing, thus increasing the inflammatory condition rather than diminishing it.

For suppurating wounds a moist dressing is often chosen; also for deep aseptic wounds I have used the following repeatedly with good results: Balsam Peru 1 ounce, iodoform 1 drachm, alcohol 2 ounces; mix. This may be applied freely over the wounded surface, then cover with gauze that has been sterilized by heat; over this should be placed a thick layer of absorbent cotton held in place by means of a bandage.

Something might be said about drainage. As to drainage tubes or packing with gauze is a question that suggests itself to every intelligent physician. One great objection to the employment of tubes lies in the fact that they are a great source of infection and should not be employed unless the suppuration is so great that it cannot be carried away or absorbed by the dressing. I much prefer a strip of gauze placed well up in the wound when it becomes evident that any drainage is necessary. The main object is to render the wound aseptic and keep it in this condition by the proper use of antiseptics and application of antiseptic dressings. The first actual dressing is the most essential thing in obtaining good union and it should be the surgeon's aim to gain this, the very point on which hangs his success with wounds of the nature described in this paper.

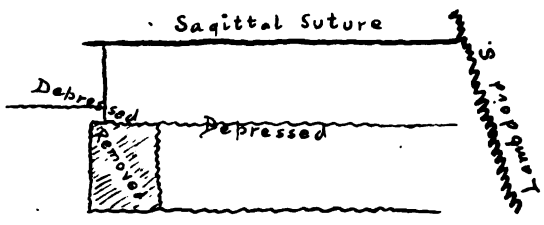
HEREDITARY MIGRAINE MITIGATED BY FRACTURE OF THE SKULL.*

By E. Burd, M. D., Lisbon, Ia.

About 3 p. m. on Sunday, Aug. 30, 1896, R. B., aged 14, while out horseback riding with a young companion, sustained a compound comminuted depressed fracture of the skull, caused by a kick by his horse. He was rendered unconscious, and the hæmorrhage at the time was great. His young companion applied cloths wrung out of cold water to the wound and the hæmorrhage soon ceased. He was then taken to his home, nearly a mile distant and I was summoned, and reached him between 4 and 5 o'clock. Found him conscious and with but little evidence of shock. There was a severe contused and lacerated wound of the scalp over the posterior su-

* Read at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

perior angle of the left parietal bone. After cleansing the wound antiseptically I found a fracture of the parietal bone at the region mentioned, the bones being completely denuded of periosteum. There were seven distinct



lines of fracture in the shape of two parallelograms, side by side, three inches long and an inch and a half wide, near and parallel with the sagittal suture.

With the assistance of Dr. James Carson I removed, under anæsthesia, a small fragment of bone, thus enabling me to elevate the depressed fragments without trephining. There was some escape of brain substance before I began work, but very little escaped during the operation. The wound was closed by catgut sutures, dusted with iodoform, and dressed with iodoform gauze and bandaged.

His temperature rose to 99.5 the next day and in the evening of the day following, after which it returned to normal and remained there. The case was dismissed on the 16th day, the wound having healed by first intention, without a single unpleasant symptom.

The patient's paternal grandmother was a woman of nervous temperament and a life long martyr to frequent attacks of migraine. She died of apoplexy. His father is of nervous temperament, and has suffered severely, completely disabling him for a day or two, since 14; and our patient inheriting the nervous temperament and the migraine as well, was a great sufferer, the paroxysm lasting over night and into the second day, disabling him from study. Since the injury, now more than two years, he had not a single return of his old tormentor until about two weeks ago, and that was short and comparatively mild, he says, and attributable, he thinks, to indiscretion in eating. His father was so pleased with the results of the accident in relieving the boy of migraine that he said that if he thought it would cure his sick-headache he wouldn't mind having his skull broken.

I shall not go into the etiology of this distressing and so often hereditary neurosis, but courteously invite a free discussion thereon.

Remarkable Vitality of Epithelial Grafts.

Dr. C. L. Junggren has recently made a number of experiments in order to determine how long a Thiersch graft will retain its vitality.

He took pieces the size of a 5-franc piece, sterilized and placed them in ascetic fluid. These were preserved from three days to six months. In no instance was there any decomposition. After varying intervals histological examinations were made. In some there were erosions of the corneal layer. In the superficial layer of cuboid cells there were patches of degenerative changes, but the deep stroma was intact. This examination demonstrated that the deep layer of epithelia was in a vital state. He then made 25 grafts, 11 of which failed, but 14 did well and closed over the nude surfaces they were placed on. The author concludes that the papillary layer of the cuticle retains vitality for a long time and suggests that when circumstances favor it we should embrace the opportunity of selecting and preserving material from amputated limbs.—Zeitschrift fur Chir., 1898.

Note.—Thiersch immortalized himself when he gave to science the graft which bears his name, for this certainly is one of the greatest boons ever conferred on humanity, as by it deformities may be overcome, limbs spared and unsightly contractions remedied; in fact, it may be employed for a thousand purposes. It is a species of epidermization which in time takes on the characters of true integuments. Junggren does well to demonstrate how long these grafts retain their vitality and how we may provide the material from discarded healthy skin. A year ago at the meeting of the American Medical Association in Philadelphia Dr. Zera Lusk of New York described a method of epidermization safe, simple and efficacious. At the same time he pointed out the remarkable vitality of the epithelial cortex. He secured his grafts by raising the upper stratum of the Malpighian layer with cantharides. This was detached, washed, stretched and dried and then laid away in air-tight cases.

He reported cases of deep burns and ulcers which were effectively closed in by these dry grafts, in certain cases the epidermis being from three to six months old, success and serviceable cuticle following in all instances. The writer takes pleasure in being able to support Dr. Lusk's valuable discovery by several instances in which it was utilized by himself with most gratifying results.—Times and Register.

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THE IOWA ASSOCIATION OF RAILWAY SURGEONS.

The fifth annual meeting of this body, which was recently held, was a success from every point of view. That Apollo of surgeons, Dr. H. L. Getz of Marshalltown, was unanimously elected president, and Dr. I. K. Gardner of New Hampton, secretary. Through Dr. Getz's good offices the Railway Surgeon secured the best papers and they will be printed in its columns.

"RAILWAY AND OTHER INJURIES OF THE NERVOUS SYSTEM."

In the spring of 1866, the late Sir John Erichsen (then a plain Mr.) delivered a series of six lectures to the students of University College Hospital, London, the subject was, "Railway and Other Injuries of the Nervous System," and owing to some of the views enunciated, these lectures gave rise to an extraordinary amount of discussion, which has continued to the present day. It is thought some extracts from the original work may prove of interest.

The motto on the title page is a quotation from the Sieur de Montaigne. "I relate, I do not judge," which hardly seems to be borne out in the body of the memoir. In the short preface the author informs us that his object was to describe certain injuries to the nervous system, commonly due to railway accidents, and which had not attracted the attention of the profession to a degree commensurate with their frequency and importance.

"These concussions of the spine and of the spinal cord," says Mr. Erichsen, "not unfrequently occur in the ordinary accidents of civil life, but from none more frequently or with greater severity than in those which are sustained by passengers, who have been subjected to the violent shock of a railway collision." After again emphasizing the fact that the shock in railway accidents is much greater than in ordinary accidents; the author defines "concussion of the spine" as:

"A certain state of the spinal cord, occasioned by external violence; a state that is independent of, and usually, but not necessarily, uncomplicated with any obvious lesion of the vertebral column, such as its fracture or dislocation—a condition that is supposed to depend upon a shake or jar received by the cord, in consequence of which its intimate organic structure may be more or less deranged, and by which its functions are certainly greatly disturbed, various symptoms indicative of loss or modification of innervation being immediately or remotely induced."

The symptoms may be arranged in three groups—the cerebral, the spinal and those referable to the limbs. The former comprise more or less cerebral disturbance indicated by headache, confusion of thought, loss of memory, disturbances of the organs of special sense, symptoms as will be seen referable to subacute cerebral meningitis and arachnitis. The spinal symptoms were pain at one or more points along the spine, greatly increased on pressure and on movement of any kind so as to occasion extreme rigidity of the vertebral column. The symptoms referable to the limbs

in brief consist of painful sensations along the nerves, followed by more or less numbness and tingling, some loss of motor power effecting one or more limbs and causing a peculiar and unsteady gait; the sphincters are not paralyzed.

As regards the pathology Mr. Erichsen says he knows of but one case where the cord from a case of concussion of the spine had been examined, post-mortem. In this case a middle-aged man was in a railway collision, and after manifesting the "usual symptoms," died three years and a half after the accident. The spinal meninges were greatly congested and an exudate covered the posterior surface of the cord, which was much lessened in the cervico-dorsal region, owing to absorption of the posterior columns. Judging from this case the pathological state was thought to consist mainly of chronic and subacute inflammatory action in the cord and membranes with consequent changes in the cord.

Prognosis is grave, but entire and complete recovery may occur. If the symptoms persist for a year or more the author says he has not known entire recovery to take place. For treatment, while little can be done, rest is recommended with counter irritation and later on tonics, etc.

Details are given of fourteen cases, only six of which are due to railway accidents. The damages awarded in the latter seem phenomenal, $28,000, $30,000, $12,500, $16,500. In the fifth case, that of a young lady, with no pecuniary loss, only a "wretched compensation" of $6,600 was awarded. This leads Mr. Erichsen to remark, sagely: "Mental sufferings, bodily pain and disability and complete annihilation of the prospects of a life, weigh lightly in the scales of justice, which are only made to kick the beam by the burden of the actual money loss of the accident."

Our author was aware of the psychical influence exerted by a favorable verdict, for he draws some of his conclusions from ordinary accidents, where there is no question of compensation for injury received, hence this "disquieting" element is eliminated. Mr. Erichsen repeatedly refers to the fact that injuries from railway accidents differ in no wise from those of every-day life, save for their intensity. In conclusion another quotation may be permitted, relating to the term "railway" spine.

"In the writings of Sir A. Cooper himself, in those of his predecessors and contemporaries, you will find many cases recorded that have incontestably precisely the same trains of phenomena that of late years have led to the absurd appellation of the 'Railway Spine' had arisen from accidents and had been described by surgeons of the first rank in this country and in France, a quarter of a century or more before the first railway was opened." And the term is just as absurd now as it was when these words were uttered a third of a century ago.

Translations.

External Dorsal Dislocations of the Thumb.

By J. Vitrac.

(Translated for The Railway Surgeon.)

It is important in backward dislocations of the thumb to take into account the lateral displacement. The thumb is habitually displaced inward, exceptionally it may be outward. In the former case the dislocation should be called internal dorsal, in the latter external dorsal. The internal and external dorsal dislocations may be complete or complex.

The internal dorsal variety is more common, it corresponds to the type described especially by Farabeuf as a "normal" dislocation. The external or "abnormal" dislocation is much rarer (5 per cent). This variety is explained by the complexity of the conditions causing its production.

In order to produce a complete external dorsal dislocation it is necessary that violent traumatism be exerted while the thumb is in extension and abduction, and that it act by exaggerating this displacement. Clinically, we find that a blow on the thumb or the hand, the fingers being widely extended, realizes these conditions. The complex external luxation is (as in "normal" dislocations) a secondary complication of the complete variety.

The clinical features are as follows:

a. In the complete external dislocation the thumb is in the form of a Z, and the phalanx is carried outside the median line of the metacarpal bone, the head makes a visible and palpable swelling in the interosseous space, it

is closer to the index than the base of the phalanx, it is possible to recognize the projection caused by the long flexor tendon against the neck of the metacarpal.

b. In the complex external luxation the thumb is shortened, it can be abnormally moved laterally, the phalanx parallel to the metacarpal is forced back and a little outside; we find the projection of the phalangeal base surmounted by a depression at the postero-external part and at the postero-internal part; we see the relief of the metacarpal head, the thumb is further from the index than the metacarpal. In a state of repose it is difficult to recognize the situation of the flexor tendon.

The complete external luxations imperfectly known and hitherto undescribed have not been observed clinically or experimentally except on occasion of their irreducibility. The only two cases observed of complete external dislocation were irreducible.

The special irreducibility of the external dorsal dislocations is due to the displacement outward of the long flexor tendon, the farther the tendon is displaced and the freer from all attachment, the more rebellious it is to reduction. The displaced tendon acts in several ways: It may render the reduction unstable. It may render it impossible either by not following the phalanx or by following it, but becoming interposed between it and the metacarpal bone.

The role of the tendon is always in evidence in complete external dislocations when the sesamoid bones can pass between the two bones, consequently not hindering reduction. In cases where these bones cannot pass, constituting an obstacle to reduction, the action of the tendon will persist none the less.

To reduce the external dorsal dislocation we must use the methods devised by Farabeuf for the "normal" internal dislocations.

In unsuccessful cases irreducible dislocations render surgical interference necessary. Two methods may be used: 1. Hooking out the tendon through a little incision (uncertain) or with the joint largely opened (more sure). 2. Provisional tenotomy of the long flexor either above the wrist or in the joint opened in front and outside.

Arthrotomy is the method to be chosen, it allows either picking up or provisional tenotomy or any other maneuver that may be deemed necessary.—Rev. de Chirurgie, 1898, 667.

Medico-Legal Notes.

The X-Ray In Law.

By Hugo Wintner, B. S., LL. B.

A discussion of this topic must, to a great degree, of necessity be speculative in its nature; for but few actual cases have been passed upon by the courts in which the X-ray has been an element. Naturally the question which propounds itself first is whether an X-ray picture may be introduced in evidence on the trial of a case as proof of the existence of the condition by it shown. Thus in an action for personal injuries, may the X-ray picture of a fractured limb be put in evidence to show the existence, the nature and the extent of the fractures? It is now the best opinion that it may be so introduced, and that the jury may be permitted to inspect it, provided always that the condition to be shown by the photograph is in issue or relative to the issue at bar. Furthermore, a photograph being from its nature secondary evidence merely, as contradistinguished from the best evidence, the proper foundation for its reception as evidence must first be laid by the party introducing it. Thus the expert must first testify to the reliability of the X-ray machine, its nature and process, the degree of exactness, etc. The reason that it is at all of any legal value in the trial of a case is the fact that science and human experience have proven that the machine is capable of giving an exact reproduction, if properly and scientifically used. Hence the necessity of first showing, and this carefully, that the machine and the working of it in the particular case at bar were all that was necessary for its complete effectiveness. The sufficiency of the proof first required to verify the picture is a preliminary question of fact for the judge presiding at the trial and is not open to exception.

The statutes of New York state provide (Sec. 873, C. C.P.) that in an action for personal injury, the court, on the defendant showing certain facts by affidavit, and applying therefor, may direct the plaintiff to submit to a physical examination by one or more physicians or surgeons, to be designated by the court; and such examination shall be had and made under such restrictions and directions as the court shall seem proper.

Quære I.—Granted the fact that the X-ray machine has certain dangerous qualities inherent in its workings, may the court nevertheless order a plaintiff to subject himself to its dangers?

II.—Suppose that upon subjecting himself to the machine, if so desired by the court, he

were injured thereby; has he redress for his injuries, and to whom could he look for such redress?

I.—It will be noted that the section referred to gives the court power to make such restrictions and directions as it may deem proper. It will be seen, therefore, that whether or not a plaintiff must submit himself to X-ray examination is discretionary with the court. It could not well be argued that the plaintiff could object to the use of a temperature thermometer, for instance, or a stethoscope in the hands of the examining physician. Why, then, to the use of any other instrument recognized by the medical and scientific world, and necessary to the examiner in acquiring the information sought? No case touching the subject has yet been brought before the courts for adjudication; hence one opinion is good until another be ventured. It has, however, been decided that the section so far as the ordering of a physical examination is concerned is not violative of any constitutional inhibition.

II.—In case of injury to plaintiff by use of the X-ray machine, he would have redress. The judge ordering the examination would incur no liability. He acts merely in a judicial capacity, in which he is called upon to exercise his discretion; and he is not liable for error of judgment, even though it be alleged that he acted without due care and prudence. (Lange v. Benedict, N. Y., 35.) The injured plaintiff's remedy must be sought against the physician under whose charge the instrument was at the time of the accident. Ayers v. Russell et al., decided in New York state in 1888, was an action brought against two physicians for damages arising out of plaintiff's confinement in a madhouse. The physicians, acting pursuant to certain statutes of lunacy then in force, had signed a certificate that the plaintiff was a lunatic. On appeal from the order of the judge committing him, which order was based on such certificate, the plaintiff was judicially declared compos mentis. The defendants sought to defend on the ground that, as they were acting pursuant to statute, they were judicial officers. The court, however, decided that their duty must be measured by the trust reposed in them by the statute and by the consequences flowing from its improper performance. They assumed the duty by accepting the trust. They were merely medical experts, and not clothed with judicial immunity, and were chargeable with that negligence which attaches to a professional expert who does not use the skill and care which his profession per se implies that he will bring to bear. Hence, if it be charged and proved that the physician in charge of the machine did not use proper care and prudence in handling it, he must respond in damages to the one injured through such negligence.—Journal of Electro Therapeutics.

Olga Paulsen, while a passenger upon an open trolley car of the Nassau Electric Railway Company, Brooklyn, on Aug. 12, 1896, becoming alarmed by the flashing from the controller or motor box situated at the front railing of the car, jumped from the car while it was in motion and fell to the ground, breaking her leg and receiving other severe injuries. In an action brought by her against the railroad company to recover for such injuries there was evidence tending to show that the flashing was of an unusual character; that the controller was out of order, a fact which was easily discoverable, and that the car had not been inspected before it left the depot on this trip. A judgment given the plaintiff for $7,500 was unanimously affirmed by the second appellate division in an opinion written by Presiding Justice Goodrich. The court held that the question of the defendant's negligence was properly submitted to the jury and that the judgment should not be disturbed. It was held that the negligence might also be imputed to the railroad company from the fact that the motorman, after the flashing and flaming began, permitted the car to continue its course without stopping to ascertain the cause of the flame until a new element of apprehension was reproduced by the burning of the fuse.—Chicago Law Jour.

Repairs aggregating $2,990,150 are demanded from the various trolley car companies in Brooklyn, N. Y. The demands are legally made in 245 suits on the October calendar in the Supreme Court, growing out of accidents due to the alleged carelessness and negligence of motormen or the reckless speed at which the cars have been run. In many cases death has resulted, and in others legs and arms have been cut off and permanent injuries inflicted, which it is impossible to place a monetary compensation upon.

This number of trolley suits does not represent all that are pending in the courts. A leading repair lawyer asserts that there are about 2,000 more suits, aggregating claimed damages of $20,000,000, pending settlement or trial. Should the trolley companies have verdicts for the full amounts claimed rendered against them their treasuries would be bankrupt.—Chicago Law Jour.

Street Railroads.

Where injuries were caused by motorman reversing the car when a prudent person would not have done so the company is liable. South Covington & C. St. Ry. Co. v. Herrklotz (Ky.), 47 S. W. 265: Where motorman by ordinary care might have discovered, in

time to stop the car, that a child was about to cross the track, the company is liable for injury to the child. South Covington & C. St. Ry. Co. v. Herrklotz, supra.

The burden is on plaintiff, in an action for injuries, to show that his employers were absent from their place of duty. Missouri K. & T. R. R. Co. vs. Faber (Kan. App.), 54 Pac., 136.

The Kentucky Court of Appeals has rendered a decision holding constitutional the Kentucky statute requiring railroads to provide separate coaches for negroes. The law was passed in 1892 and the decision is on an agreed case testing its validity. The court holds that the law applies to interstate passengers as long as they are in the jurisdiction of the state, taking issue on this point with Federal Judge Barr, who two years ago declared the law invalid.

The case decided is likely to be appealed to the Supreme Court of the United States.

Extracts and Abstracts.

Some Cases of Cranlectomy for Traumatic Psychoses.

By L. B. Tuckerman, M. D.

Case I: A gentleman, aged 48, an exemplary husband and father, and a man of excellent reputation in the community for integrity and sobriety, was kicked upon the forehead by a mule. There was produced a depression of the frontal bone in the median line just at the margin of the hairy scalp. The man was unconscious but a few moments, exhibited no symptoms of cerebral compression, and in a short time was able to be about his business. It soon became apparent, however, that his character was totally changed. He deserted his wife and sought the companionship of prostitutes. He became abusive to his children when at home, so that they would flee from him in terror. Hitherto a strict abstainer from the use of intoxicating liquors, he developed such a taste for whisky and became so addicted to its use that he wasted his property and became a drunken sot, profane, vulgar, obscene, lost to all sense of decency and manhood. This condition, interrupted by occasional promises of and feeble attempts at "reform," continued for over three years. Finally, after a long debauch, suicidal and homicidal impulses became prominent, and the relatives consented to operation. Upon removing the depressed bone a large fragment of the vitreous plate was found projecting through the dura for an inch or more into the frontal lobes. The superior longitudinal sinus was crushed and filled with organized blood-clot, and the middle frontal convolutions showed signs of pressure, but not of decided degeneration. The operation was followed by but little shock and no inflammation. Constant restlessness was succeeded by marked quietness. The countenance became more serene, the voice less coarse. As convalescence progressed he greeted his wife and children pleasantly, instead of with scowls and curses, as heretofore, and as recovery went on it was evident that he had become his old self again, gentle, affectionate, trustworthy, remaining so when last observed—two years after the operation. (This case was operated on by Dr. Emory Lanphear of St. Louis.[1])

Case II: In June, 1880, a tanner, æt. 28, sustained a fracture of the occipital bone through a saber stroke, and ever thereafter suffered severe headaches and occasional attacks of dizziness. In August, 1890, without apparent cause, the sight of the right eye became impaired, and notwithstanding the best efforts of specialists to save it, became entirely lost. In May, 1896, the left eye "began to act," as did the right six years before. An oculist reported an impaired condition of the retina, but without assigning any cause. The patient suspected that the old head injury might have some causative relation to his eye trouble, and consented to a craniectomy. A circular section of bone two inches in diameter was removed from the site of the old injury, and upon its removal the dura and brain rapidly bulged into the opening. The removed bone was replaced and allowed to lie loosely on the dura, without any attempt to force it down to its old position. Recovery was uneventful, and was followed by complete recovery of vision in the left eye. (This case was operated by Dr. Earle of Milwaukee.[2])

Case III: A young man of 20, of healthy parentage, with no hereditary taint so far as discoverable, was brought before Judge White last September for commitment to the asylum. Judge White asked me to examine him. Ten years ago, while playing on some rocks, he had fallen, striking the right frontal prominence, inflicting a scalp wound one and a half inches long, laying bare the skull and producing a depression therein. He was insensible for three days, and was unable to leave the hospital for a month. After his return home no difference was noted except that he seemed to be more active mentally than before. About two years later, however, he began to grow dull at school, showing more and more inability to get his lessons, finally com-

1. Am. Jour. Surg. and Gynecology, Aug., '97, p. 26.
2. Internat. Jour. Surgery, Nov., '97, p. 319.

ing to a complete mental standstill. He went to school till he was 17, but could not get any further than the fourth reader. In spite of increasing mental hebetude he has always been manageable till a year ago, when he began to develop periodical excitement. These paroxysms had become worse till his violence became so great as to necessitate his arrest, at which time they were occurring almost daily. The patient's reflexes were normal, pupils dilated, but responsive to light and accommodation, speech slow and hesitating; gait slow and somewhat unsteady. No history of masturbation. Has suicidal impulse. At the site of the injury is a scar, tender on pressure, but no marked depression of the bone itself. I advised operation, and on September 21 Dr. Crile, at Cleveland General Hospital, removed an oval section of skull 2x1¾ inches from beneath the scar. The scar was adherent to the outer table. The bone was indurated and considerably thickened. The dura was firmly adherent to the inner table along the line of the old fracture. After the operation the patient became perfectly tractable, made a prompt recovery and has showed no violent or melancholic symptoms since.

Case IV: A woman of 64, always in fair health up to the time of the accident, fell on the ice in January, a year ago, fracturing her left elbow and bruising her left hip and the left side of her face very severely. She did not become unconscious after the fall, but had febrile symptoms—headache, thirst, sweating—and was unable to walk for a couple of weeks. The chief attention was paid to the injury of the elbow by the physician in charge, and with but poor result. The break was a bad break—a typically medico-legal break; one of just that kind of breaks so fertile of malpractice suits—and the joint remained stiff and sore, secundum artem, and with the shadow of that break and its possible results haunting him, and with no marked cerebral symptoms immediately manifest, it is little wonder that the more important lesion should have at the time escaped the attention of the medical attendant. But as she recovered from the injury of the leg and hip and began to get about again, her children noticed that she seemed to have lost her old cheerfulness and had become inclined to melancholy. They naturally attributed this, at first, to her worry about her injured elbow, but as the melancholy increased, and as one of her sisters had before developed insanity during the menopause, and one son likewise after a severe attack of "grip," her friends became much concerned about her condition. Hoping that it might benefit her health, she was sent to visit a daughter in another city. She there began to have dizzy spells, and to develop religious delusions, paroxysms of agonizing prayer, and delusions of the unpardonable sin. It was after her son-in-law had brought her back to this city that she first fell under my observation. Examination of the cranium showed a tender, raised ridge above and a little to the front of the right temple. Alongside the ridge was a depression. In spite of sedatives to control her sleeplessness, she became more violent, threatening suicide and attempting violence on others. The alternative of craniectomy or immediate committal to the asylum was presented to the relatives. They chose the first, and on September 25, at St. Alexis Hospital, I removed an oval section of skull 2x2½ inches, including the depression. The periosteum was abnormally adherent to the line of depression. The dura was not adherent to the inner table, but upward and backward from the depression the bone was abnormally thick and hard. It may be noted here that thickening of the skull, even to producing compression of the brain substance, now and then follows contusions of the cranium, even when there are no demonstrable external lesions of the bone or scalp. As Prescott Hewett says, "A simple blow on the head, with or without a scalp wound, may sooner or later lead to mischief about the bones of the calvaria. Sometimes the diseased action thus set up ends in hypertrophy of the bones; this may go on for years, and the calvaria thus become enormously thickened."[3] At the time of operation the patient was suffering from a slight attack of pneumonia, resulting from exposure during a paroxysm the day previous to the operation. With the relief of the pressure the patient became again tractable and much improved mentally. In spite of the pneumonia, she recovered promptly from the operation. She is not yet wholly free from delusions, but such as still persist are of a milder and much less distressing character, and she has been so far amenable to home treatment and reasonably self-controlled. In this case we can hardly consider the psychic symptoms as wholly due to the misfortune of the accident. The tendency to organic change in the brain tissue was manifestly present, the trauma serving as an occasion of hastening its development. While the craniectomy could and did remove the continued irritation of the pressure, it could not and did not restore what had already undergone degenerative change. But the respite given, even if it prove but temporary, is of the greatest satisfaction to both the patient and her friends.

Case V: This case was somewhat of a cause celèbre locally. A man whom hardly any of us had ever heard of sprang into sudden notoriety by being placed under arrest for presenting a check for $75,000 at a small sav-

3. Holmes' System of Surgery, II., p. 248.

ings bank, purporting to be signed by a well-known lawyer, who at once pronounced the signature a forgery. The man made no effort to get away; he simply stayed in his office and awaited arrest. He had a plausible explanation for the possession of the check. He had been in a wheat deal with "Old Hutch" in Chicago. He had had some $160,000 of "Old Hutch's" paper. He had given the matter to this lawyer to settle up for him. Settlement had been effected for $80,000. The lawyer had kept a reasonable fee, $5,000, and had mailed him a check for the balance. He could see no reason for this denial of signature and arrest, except that the lawyer saw a good chance to keep his fingers on the other $75,000. This statement on the part of the accused did not act as an emollient to the feelings of the law firm implicated, or in mitigation of the asperity of the prosecution. Inquiry into his history showed that he was about 43 years of age; neither parent living. As a child he had received a severe blow on the crown, resulting in insensibility, and leaving a fine linear scar two inches long almost in the median line, running from the edge of the hairy scalp backward. In the median line at the anterior end of the scar is a small round depression the size of the ball of a finger. A year or so later he had been thrown from a horse, also producing insensibility. These facts were learned from an elder sister and from the woman who brought him up after his parents died. He had graduated at high school and at a state normal school, and taught in academies till 1880, when he was admitted to the bar. As a teacher he was well liked, as a lawyer he seemed ambitious to build up a clientele by faithful attention to business, and had acquired the confidence of the community where he was living. In 1882 he had a severe illness, brain fever followed by acute articular rheumatism, and was advised by his physician to go West. He went in the spring of 1883. These statements are corroborated by an old pupil of his who is now in business in this city. In July of 1883, riding out alone, he was again thrown, was knocked senseless, and picked up wandering about in a dazed condition two days afterward by a party sent out to hunt him up. He subsequently contracted chancre, for which he was treated, but with no serious constitutional sequelæ. By 1885 he had secured a school again. He noticed that he could not stand as he formerly could; that, contrary to his wont, he had to sit down a good deal of the time while teaching. About this time he began to be troubled with headaches, beginning as an intermittent piercing pain, stabbing under the frontal promontories, increasing till the whole head would ache with a pressing pain. He was dizzy at such times, and could not use his mind at this time; also, he discovered that his left leg was weaker and that he could not turn on his left heel. For some years he has been unable to use the left eye, owing to a defect in vision incorrigible by glasses. His head troubles have been worse for the last year. For these statements I was dependent upon the patient himself. An employe of his who worked for him a considerable time confirms these statements in part. He had noticed that the patient was easily overcome by heat, complained frequently of headache, and that his memory was defective. He had also noticed the peculiarity of the patient's gait. In 1887 he returned to his native state and resumed the practice of law in a large town, where he represented a well-known life insurance company. He worked hard and had a good deal of trouble with his head and his left leg and foot. This latter disability caused him to slip and strain that ankle severely. These are his statements. His friends noticed that after his return he seemed changed so much as to occasion no little comment. He seemed to have become visionary and to have his head full of schemes of the Col. Sellers type. He presented at a bank there a check for $75,000, of which he drew part and assigned part. Later it was found that the check was forged, but far from making any sensible effort at escape with what he had obtained, he went openly to New York City in a Pullman car, with the money in bags on the seat with him, and was arrested in Jersey City. He pleaded guilty, but his old pupils, acquaintances and friends then regarded his act as that of a man not responsible. Pardoned at the end of three years, he went to Chicago, whence he came here in 1894, engaging in collecting and in electric light business.

Physical examination revealed a depression at the back of the head, at the junction of the sagittal and lambdridal sutures. It was the angle of the right parietal bone, which overlies the upper portion of the visual center and the lower portion of the lower leg center for the left side. A physician of prominence where he had resided, and who had attended the accused, asserted from positive knowledge that that depression was not there prior to 1883. He had examined the patient's skull repeatedly for "bumps" when they were young men together, discussing "phrenology." Reflexes were less and pain sensation was less acute on left side. Left side of tongue was somewhat atrophied. Left leg and ankle were weaker than right. Left pupil was dilated and vision of left eye was about 1-20 normal and unimproved by glasses. The vision of the right eye was also defective, but much improved by glasses. In the left eye the form field was much contracted; color fields were also contracted, but less so than form fields. There was a slight difference in the pigmentation about the disks of the optic nerve, but

no evidence of active disease. Regarding his physical lesions as connected with the depression of the angle of the parietal bone on April 10, I performed a craniectomy, removing an oval piece of bone 1¾x1¼ inches. The skull was abnormally thickened and the dura abnormally adherent beneath the depression. As there was no evidence of abnormality beneath the dura, the membrane was not opened. As the patient recovered from the immediate effect of the operation it was evident that he was mentally more alert than formerly. His headaches ceased to be distressing, the vision in his left eye rapidly improved—greatly in distinctness and nearly to normal in form and color fields. His control of the left leg was more perfect and its reflxes more nearly normal.

This was one of the cases where "doctors disagree." The physician who treated him, the banker to whom he presented the check, his old pupil, and a business partner regarded him as mentally aberrant and irresponsible. Another partner, and the medical witness who acted in the double capacity of witness and assistant prosecutor, were as strongly of the opinion that he was simply an ordinary criminal. The various experts inclined, some to one opinion and some to another. The jury found him sane and guilty, but the lightness of the sentence imposed showed that in the judge's mind there obtained grave doubts as to the sanity of the accused. Whether he were mentally aberrant and the victim of delusions, or whether not, we cannot settle, but the case is of interest, like Case II, in showing that raising a depression of the skull in the occipital region may be followed by relief of a long-standing defect in vision, sensation and motion, and of a persistent headache of traumatic origin.

These cases are not many, but they are types of hundreds recorded and unrecorded, operated and unoperated. Surgically, they emphasize and confirm Agnew's rule that "every depressed fracture of the skull should be operated on regardless of the amount of depression and irrespective of pressure symptoms," for nearly 50 per cent of serious injuries to the frontal region, when not trephined, terminate in epilepsy or insanity, or both. It seems to me that we should go even further. In cases of contusion of the skull where there is no depression, but where pressure symptoms supervene, we should trephine for drainage and for the removal of clot, if such be found. And it would seem, further, that surgical science has progressed far enough, that it has recorded authentic cases enough to modify juridical procedure in this class of unfortunates. The prisoner is entitled to the benefit of any doubt as to whether he committed the criminal act; why not allow him the same benefit of doubt when it is a question whether he were sane when he did commit the act, especially when the history of cranial traumation is clear? Where cases like Case III are brought before a probate judge on inquest of insanity, or like Case V, before the common pleas court or trial for crime, why not remand them to a hospital for operation and give them another chance before branding them as insane or criminal? In skilled hands—that is, clean hands—the operation is not a dangerous one. The mortality can hardly exceed 2 per cent, if it reach that high. The patient and his friends would gladly choose that risk as against the certainty of disgrace or incarceration. Why not grant them the choice?—Cleveland Med. Gazette.

Penetrating Wounds of the Abdomen.

By J. L. Wiggins, M. D., East St. Louis, Ill.

Indecision is the corner-stone of so-called conservative surgery, when applied to penetrating abdominal wounds. The surgeon who calmly waits for the pathognomonic symptoms of the wounded viscera, before operating, in the light of our present knowledge of aspetic and improved technique, cannot be held guiltless of a crime.

What is here meant by "pathognomonic symptoms" is escape of viscus, fecal matter, intestinal worms, intestinal juices, bile, or the sequela—peritonitis—or death from shock, the result of hæmorrhage.

In no other class of injuries is the call for immediate action so imperative, and the results so largely within our control, as in these cases; yet in spite of this, it is the rule and not the exception, outside of our large cities, to pursue a conservative or waiting policy, hoping, that by some chance the foreign body has wormed its way through the tangled mass of abdominal viscera, has severed no vessel, penetrated no bowel or carried along its track no foreign infecting material. Strange that we, knowing how improbable this must be, wait until the pulse grows weak from loss of blood or peritonitis affixes its seal of death.

The criticism of delay in these conditions is not entirely confined to inland cities or country practice. If our unfortunate patient happens to hold a position of prominence, or is a person of wealth and social standing, frequently the many conflicting opinions of the many consultants, which he considers necessary for the proper conduct of his case, invites delay, and by the time all agree the operative time has passed. The operation is then worse than useless, for it occasions a reflection upon a means of saving life, of unquestioned value, and discourages others who might live, by means of an earlier surgical in-

terference. The public is not a close analyzer of conditions; an operation to it is an operation, and every case which merely anticipates a post-mortem causes a reflection upon a proceeding perfectly proper and, under selected conditions, full of promise.

After a few such experiences in any community we find both the profession and the public alike skeptical, and the unfortunate is permitted to die and the result charged to providence.

If the patient in our city happens to be plain Pat Murphy, laborer, it is different. The ambulance picks him up, he is taken to one of our hospitals, the house surgeon, without more ado, places him on the table; Pat is carried to his cot; later Pat walks out and is seen at his accustomed place with pick and shovel.

The press heralds his misfortune, he is of interest so long as he is unfortunate, but being well, he drops out of the public sight and a surgical triumph modestly appears in the records as—Pat Murphy, age 45, single, gunshot wound; left hypogastric; operation performed; recovery.

Since the advent of a better understanding of cause and effect, since we have become more neighborly with the abdominal viscera and look upon their traumatic and idiopathic conditions through clear and not smoked glasses; since we have refused to permit what seemed mystery to continue to remain mystery, we have made rapid progress along these lines which permits a positive rule for guidance under certain conditions, and there should be no difference of opinion as to the necessity for early operation, irrespective of place of residence or social or financial standing. Let us accept this as a rule, that every patient presenting with a penetrating abdominal wound has a right to expect, and should demand, as a safeguard, an explorative laparotomy.

Criticisms have, and will continue to be made of those who, overriding local customs, insist on doing their full duty. Errors have occurred and will continue to occur from time to time, but where one error is made from an application of this rule, hundreds will arise to charge so-called conservative with either ignorance or cowardice. Again, let me reiterate and emphasize the assertion, that in no class of cases is the call for immediate action so imperative, and the results so largely within our control. To such an extent is this a fact that were I to choose between the services of our most skilled surgeons after a lapse of 36 hours and the so-called cross-road surgeon inside of 6 hours, I would take my chances with the latter, in spite of his restricted opportunities and lack of experience.

In support of my position generally and specifically in the foregoing statements, permit me to call your attention to statistics. The "Medical and Surgical History of the War of the Rebellion" furnishes the largest and most reliable data from which conclusions can be drawn as to the uselessness of the expectant plan of treatment. Out of 3,717 cases 3,031 died, a mortality of 87.2 per cent; of 124 cases in the English army in Crimea 115 died, a mortality of 92.8 per cent; 121 cases in the French army, 111 died, a mortality of 91 per cent. Dr. Otis at the International Medical Congress, Philadelphia, 1876, after a review of reported operated cases, 9 in number, in which 1 recovered without complications, 3 recovered with fecal fistulas, and 5 died, said: "Even with this unsatisfactory result, it held out a more favorable chance than the do-nothing method, in which the recoveries could be counted on one's fingers." Fitzgerald of Australia, in 1882, resected 12 inches of intestine, and although unsuccessful, it stimulated others. Dr. Bull of New York, in 1883, and again in 1886, operated with success. And Dr. J. B. Hamilton, M. H. S., recorded a recovery in 1885. Dr. A. C. Bernays of St. Louis operated successfully in October, 1886, on Master Cash; in this case some 7 perforations were encountered. This case, so far as I am able to learn, was the first reported successful case in the West.

The latest reliable statistics which I am able to present to you are those collected by Coley; in these is emphasized the necessity for early interference. Out of 39 cases reported, in which the operation was performed inside of 12 hours, 18 recovered. Out of 22 cases reported, in which the operation was delayed over 12 hours, only 5 recovered. This in itself, without further comment, ought to be, and is, conclusive; but a further analysis would prove that the 22 cases, by reason of slight injury, location of wound or obscure symptoms, it was hoped that no fatal results would ensue. These ought to be, and probably would have shown, a much larger percentage of recoveries than in the former class in which the symptoms were, probably, so marked as to leave little room for doubt.

While I advocate immediate operations in this class of injuries, I would not have you overlook the small details which have such a bearing upon our success or failure. It is very discouraging after following accepted and logical methods, with encouraging prospects, to meet disaster by reason of some oversight or neglect by the operator or one of the attendants. I will not attempt in this article to cover the entire field. The rules applicable to general abdominal section will have equal bearing in these cases, only we cannot elaborate on account of urgency.

An understanding of what we expect to accomplish, and what we wish to avoid, will direct us as to the means employed in keeping with our surroundings. Plain everyday asep-

tic precautions should not be neglected, no matter how urgent our case. We must avoid infection from without, and thoroughly eliminate the probable nidus of infection from within. We must control hæmorrhage, repair lacerations, investigate contusions and be prepared to make resections or remove any dispensable organ which is injured past the point of recovery. While looking after these matters we must not forget that many cases are sacrificed because the surgeon thinks with only one side of his brain at a time and, while observing routine methods, forgets that the preservation of the animal heat is of vital importance and is entitled to consideration equal to any of our precautionary measures. A patient suffering from shock, the result of trauma, should not have the vitality further lowered by shock from exposure.

Observation in the practical application of certain rules I submit to your criticism; they may be elaborated on as conditions permit. A thorough shaving of the entire abdomen, followed by a free application of soap and water, will fulfill all the requirements of asepsis and antisepsis. Our main object is to avoid stitch abscess, and possible intra peritoneal infection. The thorough use of the razor is of more value than all antiseptic washes, no matter how thoroughly applied, and has the further advantage of simplicity and rapidity. These measures are enough; an elaboration is superfluous.

Incision.—There is nothing gained, and all may be lost by trying to work through a small incision. The condition for which we operate is the most fatal in surgery. Any oversight of the smallest lesion jeopardizes recovery, consequently ample room for close investigation is imperative. Make incision along median line, and make it large enough in the beginning; make it entirely with knife; scissor surgery is bad surgery.

Exploration.—Begin at a fixed point and carefully examine bowels; if hæmorrhage is alarming, have assistant compress abdominal aorta, then find bleeding point, ligate before proceeding. Repair all injuries as you advance; make your decision at time and let that decision be final; nothing is gained by returning and aimlessly reëxamining parts already disposed of; let assistant have charge of their disposition when repaired, and expose as small a portion of viscera for as short a time as possible. Keep exposed portions warm by occasional applications of sterilized hot water to cloths protecting bowels; this is preferable to the constant changing of cloths, which implies more or less handling, with consequent irritation.

Sponges—Sponging.—The commercial sponge is an unmitigated evil; it has always claimed and still retains a place in the hearts of the profession. It is hard to break away from or disassociate a surgical operation from the use of the old-time sponge.

In my early years of professional life I have known sponges to become almost sacred from association, having done duty in nearly every variety of wounds, septic and aspetic, for years. I would suggest, except in very rare instances, their use be discontinued. The gauze sponge is easily prepared and always reliable.

A little time spent in turning under edges is not wasted, as it prevents ravelings becoming detached and remaining in the abdomen. It may not be amiss to suggest that a proper means may be improperly applied. So with sponges; let their use be restricted to absolute requirements. I have seen the intestine rubbed and irritated by constant sponging of the nervous sponger until the normal glistening appearance had disappeared, and in its place an angry, rough, congested surface presented, inviting general inflammatory action, paralysis, or at least adhesions.

Repair of Perforations.—No idea can be formed of the amount of damages done by a missile or instrument, except by direct investigation. The location of point of entrance, either above or below umbilicus, may modify or complicate operation. It is well to anticipate the worst and be prepared for every emergency.

To the uninitiated, a resection is the most tedious operation, and yet should not be avoided, if conditions demand. Two or three perforations of any magnitude, in space of one foot of bowels, would demand resection, otherwise paralysis of this portion would result.

The absence of any special appliance or instruments should not govern decision; good work has been done, and will continue to be done, with restricted means, intelligently applied. The simplest suture is the Lembert's suture, and when there are many perforations no time should we wasted in trimming edges; turn them in and nature will provide means to care for slough. Wounds to mesentery, if not large, can be managed with suture or ligated en masse.

Shock.—No matter how carefully we have observed every requirement in technique, no matter how intelligently we have utilized the means at our disposal, if we fail to take cognizance of shock as a factor, we have come short of grasping the full import of the condition which we have endeavored to meet. I have but little patience with the manner in which our text-books treat this condition, and to my mind it is as untenable as the homeopathic theory of therapy. The idea that shock resulting from exsanguination can be improved by strychnia, strophanthus, digitalis, nitro-glycerine, or any of the so-called heart or nerve stimulants, is a reflection upon our intelligence, many authorities to the con-

trary notwithstanding. We have but one means at our disposal which will secure practical and theoretical analysis, that is the normal salt solution. And whether this be given intra venous, intra cellular, in rectum or left in the abdomen, its results are immediate and satisfactory. After the heart has sufficient fluid with which to work it may be further strengthened if desired, but to stimulate under conditions as before mentioned only produces that condition which it is intended to avoid. Friction induces excessive heat, just as surely in the heart as in the engine, and excessive heat means loss of force.

Irrigation.—Where there is undoubted escape of fecal or other matter in the abdominal cavity, I would advocate a freer irrigation than that usually followed; the healthy peritoneum is wonderfully potent in caring for itself, if the infecting material is not too virulent. I am convinced that we can by dilution reduce the bacillus coli to a point where it would be practically inert, or where its power for harm would be nil.

The use of antiseptics in the peritoneum is now advocated by but a few writers; they need only be mentioned to be condemned.

The normal salt solution at a temperature of 110 degrees F., gives the best results; the practice of leaving a generous quantity of the solution in the abdomen, now followed by many surgeons, recommends itself as a very proper proceeding; the rapidity of its absorption stimulates the circulation, with the further advantage of preventing adhesions. With due caution in preserving the animal heat during and after operating, by such means as encasing the limbs in cotton wool or hot dry bran packs, and hot bran padded waist, protected with rubber or oilcloth to keep dry, we will be absolved from the charge of not having done our full duty, no matter what may be the result.

My personal experiences in above operations is confined to three cases, reports of which I herewith append:

Case I: July 3, 1892, 2 p. m., M. D., colored, aged 13, while celebrating, was accidentally shot by a playmate; the bullet, 22 caliber, penetrated abdomen in left iliac region, two inches below and one and one-half inches to right of anterior iliac spine, and ranging to right side. The usual symptoms of shock presented, accompanied with nausea, sighing and excessive thirst. After explaining condition to family, they readily consented to operation, and at 4 p. m. I had patient removed to hospital. A median line incision was made reaching from two inches above pubis to two and a half inches above umbilicus. Examination disclosed two perforations in jejunum and one in ileum, from which exuded small quantities of fecal matter; hæmorrhage slight, with circumscribed congestion of peritoneum. The injured points were inverted and closed by three Lembert sutures and the abdomen flushed with sterilized water and sponged dry. Abdomen was closed by 12 mass sutures; patient was placed in bed and surrounded with hot bottles; reaction ensued promptly; instructions to nurse was: no food of any kind for forty-eight hours, no water for twelve hours and then only one-half teaspoonful doses every one-half hour until such time as stomach showed signs of its retention without annoyance. Next day, during temporary absence of nurse, a sympathetic patient saw fit to gratify patient's desire for water to its full limit; the expected results followed and retching and vomiting continued for about one hour. Fortunately no adhesions were broken and the patient made an uninterrupted recovery, being discharged from hospital in three weeks. At no time did the temperature rise to more than 101.3 degrees F.

Case II: A. M., white, aged 32 years; railroad conductor, September 11, 1894, while ejecting passenger from train, was stabbed in left inguinal region. No opportunity was had to examine weapon, and no history as to relative position of injured or assailant could be gleaned from the description, on which a conclusion could be based of any value in estimating the damage done. The wound was small, the abdominal walls thick. The patient had walked one-half mile to my office. The pulse was weak and a degree of shock was present, out of proportion to the seeming seriousness of injury. The knife had penetrated coat, vest and trousers, and with the thick abdominal walls I could hardly conceive that any injury could have resulted to abdominal viscera, the patient's condition and complaint to the contrary notwithstanding. Patient was sent home in a carriage at 7:20 p. m., with instructions to report if condition did not improve. At 11:30 p. m. saw patient; pains in abdomen continued with increasing severity; pulse weak; expression anxious; body bathed in cold perspiration. The severity of injury was then self-evident. Condition explained and immediate operation decided upon. Patient refused to leave home; our surroundings were bad; accommodations poor, and the uncertain coal oil lamp our only dependence for light; the kitchen our operating room. Patient took anæsthetic kindly; median line incision extending from below umbilicus, which was afterward enlarged upward; bowels carefully scrutinized, and wounds discovered in convolutions of small intestines.

The abdomen in left flank was filled with dark clotted blood, and much time was consumed in tracing point from which it came. As parts were sponged, place would rapidly fill again from some mysterious point undiscov-

ered and seemingly undiscoverable. We were laboring under difficulties. At a last resort a transverse incision was made to the left, two inches above umbilicus, and by aid cause of trouble, which consisted of an incision one-fourth inch wide, in descending colon, at lower border of left kidney. Through this wound a steady stream of venous blood was poured out, which had reached at least forty-six ounces, from inception of injury until controlled. The parts were adjusted as in Case 1. Improvement satisfactory until sixth day, when stitch abscess developed; the dividing peninsula was cut and parts irrigated with hydrogen peroxide. Recovery uneventful; he resumed his position on train at fifth week.

Case 3.—J. K., aged 37 years; foreman dressed beef department, Swift & Co. August 26, 1896, while demonstrating to butcher some point, lost footing on slippery floor and fell directly on long, slender butcher-knife which he held in his left hand. The knife penetrated left epigastric region, lacerated muscular tissues by being twisted in fall, and penetrated left lobe of liver, anterior margin, inflicting wound one and a half inches long; the transverse colon was penetrated on upper margin. Case came under my observation at 2:20 p. m. On account of septic surroundings, extensive laceration from twisting of knife, and further fear that knife itself by reason of the animal matter on blade had infected deeper structure, I operated one hour after injury, and found condition as before described. This operation was unsuccessful, the patient dying on the third day from general peritonitis.

This, gentlemen, comprises my experience in this class of injuries, in which I have been permitted to act unhampered. When conflicting opinions counsel delay, I have preferred to withdraw from the case, rather than endorse a position which I knew to be wrong.

My course in every case was vindicated by results, and this fact, in connection with cases herein reported, is my only excuse for the emphatic and uncompromising position taken.—Medical Review.

In the presence of any joint affection the first object of treatment should be to obtain complete rest. The next one is to secure such position that, should ankylosis take place, the limb will be most advantageously placed. In inflammatory affections, especially in children, anæsthesia may be needed to obtain the position required.—Int. J. Surg.

Children are more easily affected than adults by carbolic acid. Avoid its use in the young, as a number of cases of hæmaturia have resulted in them from the employment of wet dressings.—Int. J. Surg.

Personal.

Dr. A. C. Wedge of Albert Lea., Minn., has been elected president of the newly formed Albert Lea Medical Society.

Dr. George W. Cale of Pittsburg, Kan., has been appointed chief surgeon of the St. Louis & San Francisco Railroad.

Dr. James A. Duncan of Toledo, O., was elected president of the Wabash Railway Surgeons' Association at the last meeting.

Dr. A. L. Brown of Kansas City has resigned as assistant police surgeon and accepted a position in the Fort Scott & Memphis Railroad hospital.

Dr. F. J. Lutz of St. Louis introduced the following resolution at the late meeting of the Missouri State Medical Association, which was adopted:

Resolved, That a committee of fifteen, one from each congressional district, be appointed by the president, whose duty it shall be to prepare an address to the medical profession of the state, in which attention shall be called to the fact that there is no efficient law upon the statute books concerning public health matters and medical education, and to urge them to interest themselves in this matter in such a way as may to them seem most proper."

Notes of Societies.

Wabash Surgeons' Association.

The following officers were elected for the following year:

President—Dr. James A. Duncan, Toledo, Ohio.

Vice-President—Dr. J. W. Young, Bloomfield, Iowa.

Secretary and Treasurer—Dr. C. B. Stemen, Fort Wayne, Ind.

The next meeting will be held in St. Louis the second Tuesday in November, 1899.

Postponement of the Third Pan-American Medical Congress.

Cincinnati, Nov. 5, 1898.

To the Editor:—I have the honor to announce that in April, 1898, I received from Dr. José Manuel de los Rios, chairman of the committee on organization of the third Pan American Medical Congress, a request that, in consequence of the then existing rebellion in Venezuela, no definite arrangements be made at that time relative to the meeting of the congress previously appointed to be held in Caracas in December, 1899.

The following communication relative

to the same subject is just at hand: Caracas, Sept. 25, 1898. Dr. Charles A. L. Reed. Dear Sir:—After having sent my communication dated April last, I find it to be my duty to notify you that, although the considerations pointed out in it have already ended, our country has been scourged by smallpox, which has taken up all our physicians' activities and time, depriving them of going into scientific works. And, as that state of mind of our people and government after such calamities as war and epidemic would greatly interfere with the good success of our next meeting, I beg leave to tell you, in order you will convey it to the international executive committee, that our government and this commission would be grateful to have the meeting which was to take place in Caracas in December, 1899, adjourned for one year later.—Dr. José Manuel de los Rios.

In accordance with the request of the government of Venezuela, and of the committee on arganization, the third Pan American Medical Congress is hereby postponed to meet in Caracas in December, 1900. Charles A. L. Reed, Secretary.

Association W. N. Y. and P. R. R. Surgeons.

The Association of the Western New York & Pennsylvania Railroad Surgeons held its annual meeting Nov. 10, at Titusville, Pa. Dr. C. M. Daniels, chief surgeon, of Buffalo, entertained the surgeons en route from Buffalo in a private car, serving dinner on the car while passing from Corry to Titusville. The meeting was called to order at 2 p. m., at the Hotel Brunswick, with the following members present: Drs. C. M. Daniels, L. J. McAdam, L. G. Hanley, J. Henry Dowd, J. J. Finerty, H. Slacer, Byron Daggett, E. M. Dooly, G. W. T. Lewis, J. J. Walsh, Buffalo; Burg Chadwick, Smethport, Pa.; G. A. Ellston, Corry; G. E. Ellis, Dunkirk; J. A. Richy, Dr. C. W. Coulter, Oil City; C. B. Kibler, Corry; D. L. Eddy, Olean; S. S. Smith, B. E. Smith, Angola; W. H. Gail, East Aurora; William Varian, Titusville. After an interesting program the following officers were elected for the ensuing year: President, Dr. C. W. Coulter of Oil City, Pa.; vice-president, G. E. Ellis, Dunkirk; secretary and treasurer, O. M. Dooley, Buffalo. After supper the car was attached to train 6 and carried to Oil City, where the members were royally entertained by Drs. Richy and Coulter, the car returning this morning on train 5, arriving at Dunkirk at 10:50 a. m. The next meeting will be held in Dunkirk about the first of October, 1899.—Dunkirk Courier.

To remove blood stains, soak the towels in warm water, to which is added a teaspoonful of tartaric acid.

Railway Miscellany.

The Pass Question.

It is, perhaps, too much to hope that at the meeting of the 29th inst. it will be agreed not to print or write any annual passes for the coming year. That may—nay, inevitably will —be reached sometime; but there are not a few of those who have a voice in the decision of the question who believe that so sudden and radical a step would be unwise at present. It is not, however, too much to hope that the issuance of annual passes may be limited strictly to purposes of "exchange," for the use of properly appointed officers of railway companies. The "exchange" pass, as a matter of fact, in the majority of cases, is little used. The amount of traveling done by the higher officers of railway companies over the lines of other roads is comparatively small, the enormous majority of the passes carried by any individual officer never being shown to a conductor during the entire twelve months. There is little or no direct money loss to any railway company from the issuance of properly restricted exchange passes, and if the giving of passes had not extended beyond the circle of railway officers or employes, there would never have arisen any agitation for their abolition.

Exchange passes are bad only as being the foundation of a bad system. Annual passes have been printed, and, needing only the filling in, it is too easy to extend the circle by degrees. It is easy to treat as a railway officer entitled to a pass someone who is rendering some temporary service to the company, or traveling in a cause of benefit to the road. It is easy to give a pass in gratitude to one who at some former time, perhaps a year ago, was either in the employment of the company or rendered it a service. From that point it is a very short step to giving passes in exchange for services not yet rendered. And there are many small excuses which can be found to justify the giving of a pass as a "courtesy" to a man who—only by accident, of course—may have the shipping of considerable freight.

If there were no annual passes printed at all, it would not be possible to use them illegitimately. It is not their proper use that makes exchange passes an evil, but their abuse. Whether that abuse can be avoided without abolishing passes altogether is a question which can only be decided by experience. And to what extent, if annual passes were abolished, there would grow up abuses in the indiscriminate giving of trip passes and mileage books is another question which can only be decided in the same way.

The annual pass, the trip pass, advertising mileage—in fact, every form of transportation

except the ticket bought for cash from the company's authorized agent—is a demoralizing factor in the situation. Each and every one does more harm and results in greater loss to the railway companies, many times over, in indirect ways, than can be measured by the actual amount of traveling done on the particular tickets. It would be better for the railways and for the public morals if no ticket was ever accepted on a train except that which was bought for cash at the proper place—if no other kind of ticket existed. It will be one step, and only one, though a fairly long one, if the coming meeting decides to write no passes for the year 1899 except for strict "exchange" purposes. It will be a longer step if the agreement is lived up to during the year.

Railroads and Railroad Rates in Cuba.

A Havana dispatch to the Chicago Record gives the following interesting facts in regard to railroads in Cuba:

The Cuban government regulations for the operations of railroads have this paragraph: "The hand baggage of a gentleman shall consist of one hatbox, one satchel and one fighting chicken." This being one of the rules for the government of the railroad properties of Cuba, it may be set down that there are others equally as foolish, and that the railroads are oppressed on senseless regulations. As a matter of practice, the railroads will permit a man to carry 68 pounds of baggage, including the fighting chicken. This is a concession. One railroad, 123 miles long, has three first-class coaches, five second-class coaches, and eight third-class coaches. They are in bad condition, and would not be acceptable to a second-rate road in the United States. This same road has 85 freight cars, including box, flat and coal cars. This road runs through one of the most populous districts of Cuba, and one of the most productive. The fare one way for a passenger is $7.40 in gold, a distance of 123 miles, as stated. Added to this is a government tax of 10 per cent and a small fixed tax which the railroad collects from the passenger for the government. The total fare for the distance is a few cents less than $9. The tariff on a ton of first-class freight for the same distance is $22. A government tax must also be collected from the shipper. The railroads are all in the hands of private corporations, but the government exercises considerable control. The high prices for shipment and travel and the poor condition of the rolling stock and equipment form only a part of the troubles of the American military board trying to arrange for the transportation of troops. Lately there has been some consolidation of the different systems, but there remain fourteen different systems. The annoyance and vexation which this causes the shipper may best be explained by saying that in shipping a carload of freight from Havana to Cienfuegos four different railroads are used. Payments must be made separately to these different roads. Each one makes out its own bill of lading and incidentally pays its own government tax. Settlement must be made with each one of these roads. There is no system of prorating charges. The charges are so high that they are almost prohibitive, even for the United States government.

Some Good Steam Shovel Work.

The Cincinnati, Hamilton & Dayton Railway Company has ballasted about sixty miles of its Wellston division during the present year with gravel ballast, and in the course of the work, we are informed by General Manager Waldo, some remarkable work was done with the steam shovel. Between May 15 and July 15, or fifty-two days, 8,000 cars of gravel were distributed from a pit at Chillicothe, or an average of 147 cars per day. For twenty-one days of this period the record was regularly 180 cars per day. The pit was 1,200 feet long with a 20-foot face, and the shovel used was an old Bucyrus with a one-yard dipper, which had been repaired during last winter to fit it for this service.

The gravel was hauled on an average forty miles. Three engines and 110 flat cars, equipped with side brakes, constituted the working equipment. The cars were loaded about eight cubic yards to the car and unloaded with the assistance of two Barnhart center-ballast unloaders.

The excellent record, considering the size of the shovel used, may be attributed to the planning of the pit and the care exercised in keeping it in order, with sufficient tracks so arranged that cars could be kept constantly under the shovel. Care was exercised so that the shovel could be moved from cut to cut in a small amount of time, and the train service so planned that the shovel could be kept busy.

The arrangement of the work so that each part of the work of machinery and train service would fit into the other is creditable to Mr. C. S. Wilson, chief engineer, under whose supervision the work was carried out.

In the description of a process for hardening railroad ties, said to have been tried on the Bavarian state railways, it is stated that the process is designed to produce a chemical union of the substance of the wood itself and its preservative, and that the treatment consists in a double baking of the wood and treatment with oil of vitrol and sulphate of iron, and afterward in a bath of chloride of lime, to which milk of lime has been added, at a temperature of 100 to 125 degrees Centigrade, and at a pressure of two and a half atmos-

pheres. The first baking destroys the germs of fermentation and induces the mechanical union of the preservatives with the fibers of the wood, and the seconds hardens the wood and so changes its character that it remains dry, even when laid in damp places. The whole process takes about six hours, and costs for an ordinary tie about 2 cents. Microscopic examination shows that the anticeptic substance penetrates completely through the cell walls, while the cell cavities are empty; also the hardening of the wood is quite remarkable, and adds considerable to its durability, especially in moist situations.

Alton's New Bridges.

Having just completed a new bridge across the Mississippi at Louisiana, Mo., the Alton company is now planning to rebuild another big bridge over the Missouri at Glasgow. Following the same lines the company will place every bridge on its system in first-class condition and ready to take care of the growing increase in the weight of locomotives and trains. The work of rebuilding the Louisiana bridge has occupied two years and cost more than $250,000. The draw-span is entirely new and most of the other spans have been rebuilt. All the work was done without the slightest delay to the traffic. The total length of the bridge is about 2,000 feet. The Glasgow bridge is less than half that length, but has an unusually long approach. Plans for its reconstruction have all been prepared, but no work will be done on it until next spring.

It is reported from Montreal that the officials of the Canadian Pacific Railway are disposed to share the views of their representative on the board of arbitration in the matter of the transcontinental freight differentials, to the effect that the decision of the majority of the arbitrators was based only on the technical or legal meaning of the word "entitled," and that proper consideration was not given to the moral or material questions involved. Mr. Shaughnessy is quoted as saying that, if this is the case, "the question must be submitted again in such form as to obtain a decision on the broad merits." We do not believe that the company will maintain this position, which would be in singular contrast to the courtesy with which the decision of the interstate commerce commission was accepted in the passenger question, and would also be inconsistent with the general reputation and conduct of the officers of the Canadian Pacific. It may be true that in their final conference the arbitrators discussed only the technical meaning of the words of the resolution under which they acted. It must be remembered, however, that they had, in the course of the hearing, listened to most able expositions of the moral and material questions involved as well. Both on the part of the Canadian Pacific and of the American lines, the "business" aspects of the case were very fully argued. It is not conceivable that if Mr. Washburn and Judge Day had been convinced by those arguments that there was any material consideration which ought to outweigh the legal or technical questions, they would not have so stated in their decision. The fact that they did not so state, but rested their decision only on the terms of the resolution, ought to suffice. Some lesser company might afford to refuse to accept a decision of an arbitration board on the grounds alleged, but it ould be unworthy of the Canadian Pacific.

Obituary.

Theodore C. Sears, formerly general attorney of the Missouri, Kansas & Texas, died recently at Seattle, Wash.

Franklin P. Kaercher, secretary of the Philadelphia & Reading Coal & Iron Company, died at Philadelphia, Pa., Nov. 5.

J. P. Coyle, manager of the International Steamship Company, died at his residence in Portland, Me., Nov. 6, at the age of 57 years.

E. A. Elder of St. Augustine, Fla., superintendent of buffet service of the Florida East Coast Railway, died at Toledo, O., Nov. 11.

Preston Roberts, Sr., formerly president and general manager of the Kansas City & Northwestern, died at Independence, Mo., Nov. 14, at the age of 73 years.

C. H. Summers of Chicago, general electrician of the Western Union Telegraph Company, died suddenly of heart disease at San Francisco, Cal., Nov. 3.

W. B. Baldwin, master mechanic of the Illinois Central at McComb City, Miss., was instantly killed near Arcola, Nov. 5, in jumping from the engine of a train which was about to run into the rear of another train. He was 45 years of age, and had been connected with the Illinois Central for many years.

William G. Sargent, formerly general passenger and ticket agent of the Pittsburg, Shenango & Lake Erie, died at Waterford, Pa., Oct. 22. He was born at Summerville, N. J., Nov. 25, 1837, and entered railway service in 1861 as paymaster for the contractor of the Atlantic & Great Western. He was appointed paymaster of that road in May, 1863, and held the position for fifteen years. In 1890 he accepted the position of general passenger and ticket agent and purchasing agent of the Pittsburg, Shenango & Lake Erie, and was continued as general passenger and ticket agent when that road was reorganized as Pittsburg, Bessemer & Lake Erie in January, 1897. He resigned in June of the same year.

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TRAUMATISMS OF THE URETHRA.

BY G. FRANK LYDSTON, M. D.,
Professor of Genito-Urinary Surgery in the Medical Department of the State University of Illinois.

One of the most important of the various injuries incidental to railway accidents is traumatism of the urethra. There is a question in the author's mind as to whether the remote possibilities of such injuries are not of greater importance than the immediate results, because of the insidiousness with which obstruction of the urinary way develops long after the injury that produced it is forgotten.

For the purposes of the present paper, urethral injuries by external violence will be alone considered. Injuries from instrumentation, willful introduction of foreign bodies, or surgical operations, do not come within its province.

Method of Production:—The urethra may be injured (a) by direct force applied to the perineum; (b) by the penis being caught between two impinging bodies; (c) indirectly by crushing injury to the pelvic bones, the fragments of which are driven into the urethra; (d) by dragging upon the penis.

Varieties as Regards Form:—Urethral traumatisms may consist of (a) contusion; (b) laceration; (c) incision. These qualities may coexist in the same injury, being dependent upon (a) the shape of the impinging body; (b) its direction, and (c) the force of impact.

Varieties as Regards Severity:—Urethral injuries may be classified as injuries of the first, second, third, fourth and fifth degrees.

First degree.—Contusions producing slight or no symptoms, or, perhaps, only evidences of bruising in the perineum. These injuries, trivial as they seem, are quite liable to cause stricture, sooner or later.

Second.—Injuries attended by more or less hemorrhage from the urethra, without severe local symptoms at the site of injury, and no obstruction to urination.

Third.—Injuries attended by considerable swelling and ecchymosis, with more or less urethral hemorrhage and more or less obstruction to urination. Retention either does not occur or is easily relieved. Hæmorrhage may be absent.

Fourth.—Complete severance of the urethra without perineal wound, usually accompanied by more or less hemorrhage, and with immediate complete retention. Catheterism is difficult, perhaps impossible.

Fifth.—Complete severance of the urethra with external wound communicating with the urethral laceration. In the other varieties an external solution of continuity is of no consequence, because not communicating with the urinary way.

It is to be remarked that the foregoing division is by no means intended to be arbitrary. It is, however, a practical clinical guide. The external evidences of injury are not necessarily a criterion of the severity of the urethral traumatism per se. The urethra may be very badly damaged without any external injury of moment.

All of the severe varieties of urethral trauma are likely to be followed by serious results. In general, the results of urethral trauma are as follows:

1. Hemorrhage.
2. Retention of urine.
3. Urethritis.
4. Cellulitis and gangrene.
5. Extravasation of urine, causing (a) cellulitis, (b) gangrene, (c) peritonitis.
6. Septæmia.
7. Such remote results as (a) fistula, (b) stricture, (c) false passages from attempts to introduce instruments through the lacerated canal.

Hemorrhage is rarely fatal because of the lacerated quality of the wound, and because

the same ecchymotic swelling that shuts off the urinary way also prevents escape of blood per urethram and via the vesical neck into the bladder.

Retention of urine is always a serious matter, but can always be relieved by surgical measures.

The danger of extravasation and simple contact of the urine with the injured surfaces largely depends upon the condition of the urine and the length of exposure of the tissues to its influence. Normal urine, with free escape, is in no wise injurious to the tissues. If septic, either primarily or from being pent up in the tissues for a time, it is exceedingly dangerous, not only locally, but generally.

Urethritis from urethral trauma is simple, easily cured, and demands no attention here.

Location of Urethral Trauma:—The anterior urethra is rarely injured. The penis is a very uncertain quantity, and extremely difficult to catch between two impinging bodies. The perineal urethra, on the other hand, is easily injured. Falls or blows upon the stride result in catching the deep urethra against the sharp lower border of the sub-pubic ligament. Slight force may produce severe laceration, or even complete solution of the urethral continuity.

Treatment:—Nearly twenty years' experience has taught the author that urethral injuries are rarely properly treated, particularly from the standpoint of prophylaxis of subsequent stricture. Where the perineal and urinary symptoms are slight there should be no interference for a week or ten days. Dilatation with sounds should then begin. Where the local symptoms are slight, yet retention exists, morphia, hot baths and hot perineal fomentations often relieve. A one per cent solution of cocaine injected into the urethra is often effectual in relieving the spasm and congestion that are responsible for the retention. Catheterism is to be avoided where possible. When the retention is found to be obstinate, a small, soft catheter should be gently passed. Very slight force may produce a false passage. When once a catheter has passed, it should be left in the bladder for a week or two, according to the severity of the injury and difficulty of catheterization. Systematic sounding should then begin. Where catheterism is extremely difficult, and where extravasation seemingly exists, perineal uretherotomy, with free incisions wherever fluid appears to have accumulated, should be performed at once. There should be no hesitancy in operating. When in doubt, operate. The patient's chances of escaping serious immediate results and remote stricture are thereby enhanced an hundred fold. Where the urethra is completely severed, an attempt should be made to unite it with fine catgut. Where there is difficulty in finding the proximal end of the urethra, supra-pubic section and retrograde sounding are demanded. Prolonged search for the urethra in the perineum is bad surgery. Go in above, and get at the urethra in an intelligent and workmanlike manner. Perineal guessing is bad work.

Prolonged drainage per urethram is essential. Whenever the urethra is stitched, supra-pubic drainage is demanded. Switch off the urine, and the chief source of danger is averted.

Long continued and systematic sounding is necessary after the drainage tubes are removed.

Urinary antisepsis, local and per orem, is indicated during the course of urethral injuries. Boric acid irrigations, with salol and oil of eucalyptus internally, accomplish the desired result better than anything known to the author. Severe hemorrhage demands perineal section, perineal and urethral packing and drainage.

INJURIES TO KIDNEYS.*

By D. C. Brockman, M. D., Ottumwa Ia.

I have realized for a long time that the average doctor does not appreciate the importance or frequency of renal trauma, and know of no subject the discussion of which will be of more benefit than this, especially in an assembly composed of men most likely to see accident cases, as is a meeting of railway surgeons.

I am certain that many cases that are diagnosed by that blanket term "internal injuries" (which, by the way, was rightly excluded from our vocabulary at the last meeting), would,

* Read at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

under a more careful analysis, come under the class we are now considering.

The paucity of early symptoms, the incomplete history of accident, the many directions from which the vulnerating force may come, the frequent lack of localized pain in kidney region, are all factors that obscure the early diagnosis. But knowing these difficulties we should use an extra amount of diligence in the diagnosis of all obscure abdominal injuries. The application of any considerable force to the middle part of the body may result in the laceration of a kidney, but they most frequently result from stab or other penetrating wounds, severe kicks or blows over the region of loins, fall of considerable distance, lighting on feet or buttocks.

The laceration may vary to a great extent in different cases. The kidney may be crushed to a pulp or it may have only a limited ecchymosed patch that will cause bloody urine for a few days. Most often the injury is a laceration of the pelvis, either intra capsular or extending through the dense capsule. In not a few cases the organ has been torn entirely through. Such a case came under my observation several years ago in which the kidney was completely divided into two parts—the renal artery had not been divided, so its function was still being performed, but the ureter had been destroyed, and the urine, together with the free hæmorrage, rapidly dissected the peritoneum from the back so that when a late incision was made the cavity held nearly a gallon of blood and urine. This case resulted from the kick of a horse, through thick winter clothing. There were no external marks and the urine passed was only slightly tinged with blood, hence the attending physicians did not appreciate the situation until too late to save the patient's life.

The symptoms are governed largely by the extent and character of the injury. A knife may penetrate the kidney causing but little shock, and as there is free drainage to the resulting fluid, but little pain would follow. A blow may cause bruising or ecchymosis of a small amount of kidney tissue, with no symptoms referable to the kidney until the bloody urine is discovered.

The kidney may be seriously injured in common with other tissues and this part of the trauma not be discovered at first. In fact, it is usually impossible to make an accurate diagnosis of the cases from symptoms that occur immediately after the accident. The usual symptoms are: Evidence of force applied to region of kidney, pain in region of kidney, frequently running down ureter closely simulating nephritic colic; caused by clotted blood being forced down ureter, shock frequently out of proportion to external evidence of injury. After a few hours when urine is passed it will contain more or less blood. I say when it is passed, and I beg of you to allow the patient to pass the urine and not subject him to the great danger of vesical infection by passing a catheter.

The amount of blood passed does not indicate the amount of injury to renal tissue. In the case above referred to but little blood was thrown off on account of the rent in ureter. In another case I had very free, in fact, alarming hæmorrhage, without any other well-defined symptoms of renal injury. This case resulted from being thrown from a wagon against a hard dry bank by a runaway team. The hæmorrhage subsided in two or three days and the man was practically well. he evidently received a slight tear in the pelvis without rupture of capsule. At times the blood does not escape immediately after accident. In one case but little blood escaped at first but great tenderness and resistance occurred over the loins—symptoms that would now suggest an operation, but as this was 16 or 17 years ago, we were not hunting as assiduously then as now for nephrotomies. On the second day the patient passed a large amount of bloody urine, greatly to his relief. Probably the ureter had early become obstructed by a clot, which was later blown out by the hydraulic pressure of a retention cyst. This case eventually recovered.

Usually after a renal trauma, in addition to bloody urine we have persistent pain in the loin that grows worse, frequently accompanied by pallor and shock showing internal hæmorrhage, soon a dense painful resistance with dullness over kidney, in fact, the classical symptoms of a rapidly forming retention cyst. These are the cases that require early, accurate diagnosis, so that appropriate treatment may be instituted in time and not as in case referred to, wait till irreparable injury has been wrought by sepsis and the distention

due to retained fluid. All the symptoms should be carefully analyzed in any case of trauma resulting in pain or tenderness over kidney region with hæmorrhage; and kidney injury suspected, until proven to be absent.

In but few classes of injuries is the prognosis influenced more by treatment than in these. In slight injuries the prognosis is good under almost any treatment except in patients with sepsis in some part of urinary tract, as cystitis, but not so in severe cases. Here all depends on competent surgical skill and judgment. It is almost impossible for an extensive kidney lesion to recover without an operation, and on the other hand, no matter how severe the injury to a kidney may be, the prognosis is good under proper treatment, provided the other kidney is competent and no other serious injuries were received.

The treatment in slight lesions consists in absolute rest in bed, anodynes, if indicated, and restricted diet. Possibly in thin persons ice bags to loins may be good, but I prefer to keep patient absolutely quiet by the aid of free use of morphine. All forms of stimulants and diuretics are contra-indicated, as, I believe, is also the old-time specific for all hæmorrhage—ergot. The physiological action of ergot is to contract the capillaries and encourage arterial tension and thereby encourage arterial hæmorrhage.

In case the bladder becomes filled with clots it should be irrigated with a solution of pepsin, which should stay for an hour, when the clots will be all dissolved, but all such instrumentation should be done with the most scrupulous surgical cleanliness, as bladder infection here will probably convert a simple injury to the kidney into a dangerous surgical kidney. This one point cannot be too strongly insisted upon. If the hæmorrhage persists and the patient is becoming anæmic, it is best to cut down onto the kidney and examine it carefully to see if the bleeding cannot be stopped and the kidney saved. By a free incision the kidney may be brought up into view, the capsule opened and the source of hæmorrhage sought for. If it comes from an artery it can be tied, if parenchymatous bleeding it may be stopped by firm packing. In case the injury is so severe that the blood cannot be controlled a nephrectomy will be required.

More frequently where there is an injury sufficient to cause alarming hæmorrhage the ureter will be either obstructed by clots or torn off, and instead of excessive hæmorrhage we will have blood and urine accumulate about the injured kidney, causing a retention cyst that can soon be easily defined. A beautiful example of this type came under my care in a ten-year-old boy last winter—the result of a coasting accident. An hour after the injury the lad had no external marks or bruises, but complained of pain in right loin extending down to right testicle and was suffering markedly from shock. In two hours he passed bloody urine. At 10 p. m., twelve hours after the accident, he showed anæmia and a tense tumor could be discovered over right kidney. Moved him to a hospital and at midnight cut down to kidney, which was found surrounded with clotted blood and urine—a rent from pelvis extending more than one-half way through the organ—the ureter and renal vessels being in contact. I packed the tear firmly with iodoform gauze and partly closed the wound. The hæmorrhage was controlled but nearly all the urine escaped through incision. Renewed the packing in five or six days and repacked loosely for drainage and in five or six weeks the wound closed entirely. There was a small amount of albumen in urine for three months when the boy was entirely well.

In cases where the vessels are torn off, or where the tissues are too badly injured, or the ureter torn off, it will be necessary to remove the organ, or in case the patient suffers from cystitis or other septic genito-urinary disease it would be an open question to be decided by an analysis of all the conditions whether the kidney should be saved or not.

Here, as elsewhere in the practice of our art, the surgeon must be governed by surgical principles and good common sense—must be prepared to do what is indicated for the case in hand and cannot be governed by any set of rules or follow any working formula. Here, as anywhere else, that surgeon succeeds best who most carefully studies the individual case and applies in its treatment the broad principles of modern surgery.

Never leave an unrepaired rent in the omentum, as it may give rise to intestinal strangulation.—Ex.

RANDOM CLINICAL NOTES.*

By H. A. Leipziger, M. D., Burlington, Ia.

HYPNOTIC SUGGESTION IN ANÆSTHESIA.

Whatever may be the surgeon's opinion regarding the value of hypnotic suggestion as a therapeutic agent, no one who has given it a fair trial in anæsthesia will doubt its value. At your next operation you may try this method, and find a man or woman who responds to your suggestion to go to sleep by laughing in your face, and telling you that he or she is not weak-minded and cannot be talked into going to sleep. Your colleagues may join in the hilarity, and you may become so thoroughly imbued with the ludicrous aspect of the situation that you may not attempt the method again. If so, you will make a mistake. I am satisfied that a considerable proportion of cases are susceptible to hypnotic suggestion, and become anæsthetized by a very much smaller amount of anæsthetic and in a much easier manner than by the method in common use. What the proportion of susceptible patients is, or by what signs we are to distinguish these from the non-susceptible, I am not prepared to state.

The rule I am governed by is to attempt the suggestion with all patients, and the results have been very satisfactory. There is nothing lost by the attempt to save a few minutes' time in the cases in which it fails, and often many minutes saved where it succeeds. The modus operandi is, briefly: To secure the patient's confidence; remove all objects and persons which divert the patient's mind; explain how the anæsthetic is going to act; allay fear; keep everything quiet, removing even a ticking clock or watch; impress the patient with the belief that when you tell him or her that sleep is coming on he or she will feel drowsy, and after the first few whiffs make use of some suggestive remark uttered repeatedly as nearly as possible in the same tone of voice. The customary one is: "Now you will go to sleep; now you are getting drowsy; now you will sleep; sleep, sleep; drowsy, drowsy, sleepy, deeper, deeper, sound asleep." I have failed frequently; perhaps oftener than I have succeeded. But in many cases—notably with children—have produced profound anæsthesia in from two to five minutes, with as little as twenty to thirty drops of chloroform. Have anæsthetized by dropping alcohol, or even water, upon the Esmarch inhaler. In one case, a test examination of alleged railway injury, produced complete anæsthesia by holding the inhaler over the patient's face without applying anything whatever to the same. We know anæsthesia is produced by hypnotic suggestion simple and alone. But the books have little or nothing to say about its combination with our ordinary methods of inducing anæsthesia, and I am convinced of its unquestioned usefulness in very many cases.

EXTERNAL HEAT TO PREVENT SHOCK.

Every operator appreciates the importance of keeping the patient warm during the operation. The room is frequently heated to a very uncomfortable degree with this object in view, and ingenious contrivances are adopted to keep the table warm by currents of warm water or electricity. Our cheaper substitutes for these appliances are the hot water bags or bottles. If my own experience resembles that of many other surgeons, it behooves us to pay more attention to the management of these heating apparatuses. I have had quite a few patients burned by the hot water bags; some while on the table, others after they had been removed to the bed. If the bags are only lukewarm they serve no purpose, and perhaps extract heat from the body instead of supplying it. If they are too hot, they require careful watching. Of late I have made it a rule to have an assistant or nurse attend exclusively to the care of these appliances. It may be that patients depressed by the operation or anæsthetic, or both, are more easily burned by an amount of heat which previously would be well borne, or the state of semi-consciousness upon coming out of the anæsthetic makes them less sensitive to the heat, so that they permit of the skin being considerably injured before calling attention to pain. At all events, I believe careful attention to this part of a surgical operation is as essential as any of the other duties of assistants, and it pays to impress the greatest care, in every operation, upon the person

* Read at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

managing the hot water bags and upon the nurse who watches the patient after being placed in bed, until full reaction has set in and heat can be removed.

DRY SEPSIS.

I use this term to designate a form of sepsis which I have met in three cases. It is very virulent and apparently altogether constitutional. In it the wound assumes a deceptively healthy appearance to one who has no acquaintance with the condition. The cut surface, or granulating surface, looks red—a little too red—there is apparently a fair attempt at repair, and no discharge, nor swelling, nor pain. The first case was a compound fracture of tibia and fibula about two inches above the ankle-joint, in a man about 50, of bilious temperament. The street dust and dirt was ground into the wound. Ordinary care was exercised in rendering the wound antiseptic before reduction; and, judging from immediate results, the case promised favorably. Within a few days a peculiar drowsiness appeared, from which the patient could be easily roused. This drowsiness, without fever, or very little at best, without pain, without inflammatory change at the wound, was the only untoward symptom. The functions of the excretory and secretory organs were practically normal. When not dozing, the patient would enjoy his cigar, talk rationally, and seem, if anything, a little too comfortable for normal convalescence. The only other peculiarity, which developed in another case also, was an inclination to be unnaturally facetious, bordering a little upon silliness. The attacks of drowsiness became more frequent and lasted longer. After a futile attempt, by large, free incisions and wet antiseptic dressings, to arrest the progress of the sepsis, amputation below the knee was performed about ten days after the injury, but to no avail. The patient died in coma about twenty days after the injury.

The second case was a similar injury in a man of over 60 years, with excellent constitution and no taint of any kind. Warned by the conduct of the preceding case, extraordinary care was taken in cleansing the wound; and when, nevertheless, similar symptoms to the above arose very insidiously within two or three days, amputation was done on the third or fourth day, with a successful issue, the patient making a somewhat tardy, but complete, recovery. The only other case in which I saw a similar train of local and constitutional symptoms was in a man of 56, who was attacked with acute osteomyelitis of the ilium. The wound, after incision of the soft parts and thorough curetting and gouging out of the diseased bone, presented the same dry appearances; very slight effort at healing by apparently healthy granulations were observed; semi-stupor and the peculiar levity or silliness of temperament were marked; the stupor increased, and coma ended the scene thirty days from the onset of the disease. I have no authority for saying that the other cases were also osteomyelitic, because the descriptions of this disease do not specify this peculiar train of symptoms of dry sepsis, but I am inclined to believe that in the bone medulla in all of the cases was the focus of infection, and they were all of this class of sepsis.

INJURIES INVOLVING THE LOWER END OF THE FEMUR*.

By A. B. Bowen, M. D., Maquoketa, Ia.

The largest, longest and strongest bone in the body has ever received its share of attention from surgeons and pathologists; from its susceptibility to lesions and pathological changes, the reasonable sequence of its varied functions and anatomical structure. For convenience of description we divide it into a shaft, and two extremities, each part performing functions peculiar to itself, and each part subject to laws of growth and decay.

The upper extremity presents for consideration a head, neck, and the greater and lesser trochanters, while the long, firm cylindrical shaft terminates in the condyles below, each part admirably adapted to the varied functions it is expected to perform in the battle of life. These prominent and essential parts are variously interspersed with prominences, depressions, tubercles, tuberosities, fossas, lines, ridges and borders. Each has a purpose for the attachment of tendons, ligaments and muscles; for the transmission of vessels,

* Read at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

nerves or tendons; or to serve some other useful purpose in the economy of nature.

The femur is developed by five centres of ossification, it being the first of all the long bones to show ossific deposit, which appear in the shaft at the fifth week of fœtal life; the centre of ossification appears in the lower epiphysis at the ninth month of fœtal life; from this the condyles and tuberosities are formed; in the head at the end of the first year after birth, in the greater trochanter during the fourth year; while in the lesser trochanter it is delayed till the twelfth or fourteenth year. The order in which the epiphyses are joined to the shaft is the direct reverse of their appearance. Their junction does not commence till after puberty; the inferior extremity being the first to develop, is the last to join the shaft, at about the twentieth year.

The thigh bone is subject to a great variety of fractures and injuries from the great burdens imposed upon it, from its exposed position, and from the contractibility of powerful muscles, as well as from the effects of pathological and senile changes. The shaft of the femur may be broken in any portion of its extent, but there are three points which are particularly obnoxious to fracture; these are the upper fourth of the bone, the middle and inferior fourth. The inferior fourth is less frequently the seat of fracture than the other sections; but the consequences, if anything, are more disastrous, for if the fracture is in close proximity to the joint, the lower end of the upper fragment may penetrate the joint, and thus seriously complicate the results.

The line of solution of continuity generally ranges from behind forwards, and from above downwards; and the lower or distal fragment is very liable to be drawn downwards and backwards by the action of the gastrocnemius, popliteus and plantaris muscles, which, tilting the bone backwards, bring its sharp upper extremity against the popliteal vessels, which may be injured by the same, either by compression or laceration, thus requiring caution and skill to avoid an accident that may arrest the vitality of the leg.

The fracture or separation of the lower epiphysis is conceded by such authorities as Gross, Hamilton and Ashhurst (as well as many others) to be a rare accident, and frequently difficult of diagnosis and management. Hamilton mentions several examples of this injury in his own practice and that of other surgeons; they are usually the result of direct violence, and have frequently called for amputation, either primarily or subsequently.

L. V., age seven years, had his left leg wound around a "tumbling rod," sustaining severe contusions, and as the attending physician pronounced, a dislocation of the knee-joint. After the reduction of the supposed dislocation, and antiphlogistic treatment for three days, a plaster cast was applied, which proved so uncomfortable that it was removed in a few days, the limb being swollen, the circulation poor and some vesicles present. I saw the case some three weeks after the injury, found the leg cold and gangrenous; and instead of a dislocated knee, a separation of the lower femoral epiphysis, with the end of the femur pressing in the popliteal space and compressing the popliteal vessels. I amputated the thigh in its lower third, and the patient made a good recovery.

W. T., age 55, fell violently on the frozen ground, sustaining a fracture just above the condyles; the sharp lower end of the upper fragment perforated the flesh, thus rendering the fracture compound, and a vertical fracture extended into the knee-point. With this alarming condition it seemed the most favorable result to be expected would be an archylosed joint. Extension and coaptation were perseveringly applied, after four weeks passive motion was gently resorted to, and the patient recovered a very useful limb, with no perceptible shortening, but with flexion abridged.

L. A., age 40, had right leg crushed under a load of hay, sustaining a fracture of the lower end of thigh bone; severe tumefaction attended the injury; the attending physicians attempted to reduce the fractures and applied splints and dressings, and combated inflammatory action, which was severe. Three weeks later I saw the case, in consultation; the entire leg was involved in gangrene; the condition of the system was unfavorable for an operation, from long suffering, loss of sleep and septic infection, but the prospects of improvement from delay offered little encouragement from this mass of dead tissue. I amputated through the middle third of thigh and the pa-

tient rallied admirably. In addition to the involvement of the joint the lower fragment was drawn backwards, compressing the popliteal vessels, and thus contributing to the death of the limb.

If the separation of the lower epiphysis of the femur is a rare accident, the separation of the upper epiphysis of the tibia is yet more rare. I mention this to report a case I saw with Dr. E. C. McMeel of Delmar, September 24, 1898.

C. C., aged 14, had his right leg entangled in the spokes of a wagon wheel in such a manner that he sustained a compound fracture—or separation—of the upper epiphysis of the right tibia. The end of the bone protruded through the popliteal space, badly lacerating the muscles of the calf; the bone was denuded of periosteum for several inches of its extremity, the end of the bone presented that stellated appearance, characteristic of a complete separation of the epiphysis; the popliteal artery, vein and nerve were severed, and the profuse hæmorrage that naturally attended the divisions of the large vessels was arrested spontaneously and enabled the patient to be moved two miles to his home, where we amputated at the knee-joint. Results most satisfactory.

October 10, with the assistance of Drs. Knittle and Robo, I amputated through the lower third of the thigh for I. Y., a laborer, age 54, the result of traumatism to the knee-joint several months previous; the case was badly managed; rest so essential to an inflamed and diseased joint was ignored; inflammatory action invaded the tissues of the joint, including the osseous tissues;; the cartilages were eroded and necrosed, and separated readily from the trochlear surface of the bones; the ligaments were thickened, softened and ulcerated, while the roughened necrosed ends of bone were so sensitive as to be intolerant of motion and manipulation, thus justifying amputation.

When a patient first uses crutches, see that the arm pieces are thoroughly padded if any exclusive use of the crutches is expected. Paralysis due to pressure on the nerves is not uncommon. The musculo-spiral is most frequently involved, giving wrist-drop. The ulnar is also sometimes in jured, but any or all of the nerves may be affected.—Int. J. Surg.

IS DIRECT APPLICATION OF THE ROLLER BANDAGE TO THE LIMB IN FRACTURE ON FIRST DRESSING GOOD SURGERY.*

By C. M. Drumeler, M. D., Panora, Iowa.

When attending lectures some twenty-two years ago, we were taught that it was not good surgery to apply the roller bandage direct to the limb on first dressing of fracture. Since then we have seen the roller directly applied to the limb by good surgeons, and no unpleasant result followed.

We became interested, and began to investigate what had been written and published on this subject by some surgical authors. We will quote a few and what they say to-wit:

Hamilton on "Fractures and Dislocations," fifth edition, page 48:—"Except in rare cases and for especial reasons, which we shall attempt to indicate in their appropriate places, we cannot recommend the employment of any kind of bandages next to the skin." Published in 1875.

In Vol. IV., page 53: "International Encyclopædia of Surgery," edited by Ashhurst. We find the following:—"In former times a custom prevailed of applying what was known as an immediate bandage to fractured limb in order, as was supposed, to prevent muscular contraction. This custom has now been generally abandoned, although it is still followed by some practitioners, it never can do any good, and may do much harm." Published in 1884.

In Holmes' "System of Surgery," American Edition, edited by Packard, published in 1881, no opinion is expressed on the subject.

"Malpractice Suits," by McClelland, page 176, says:—"Plaster of Paris as a primary dressing requires large experience, inasmuch as it is likely to be followed by the same bad results that so frequently follow the use of the primary or initial bandage."

"The American Text Book of Surgery," edited by W. W. Keen and J. Wm. White, page 285, says:—"Dressings applied circularly about a limb expose it to the danger of con-

* Read at meeting of Iowa State Association of Railway Surgeons, Clinton, October, 1898.

striction, and consequently gangrene, if swelling should occur after the dressing has been applied, and therefore as a general rule such should not be used during the first few days, or if used should be frequently inspected. As a general rule a roller bandage should not be applied to the limb under the splints, it will rarely do good, and may do great harm." Published in 1893.

Wyeth's "Text Book on Surgery" advises that simple fractures be not bandaged up tightly until danger from swelling has passed.

Dennis' "System of Surgery," Vol I., page 523, says: "In the forearm a bandage should never be placed over the limb in contact with the skin and under any splint, since it may cause undue approximation or fusion of the two bones and thus prevent the movements of pronation and supination." Again, in Vol. II., page 19, it says: "Those who have little experience in the application of roller bandages are apt to apply the bandages too tightly and this may lead to disastrous consequences, especially in the dressing of fractures." Published in 1895.

In some cases of fracture we have used the primary roller very satisfactorily. In other cases when we applied the roller we allowed for the swelling that would follow the injury—our judgment was faulty, the limb became more swollen than anticipated, causing the patient discomfort and unnecessary pain. We believe that for surgeons located in the country and little towns, far removed from hospitals and trained nurses, dependent upon his own resources, that in the use of the primary roller there is danger, and that it should not be used

Accidents to Workingmen.

Dr. Wolff of Strasburg, one of the best authorities in Germany on workmen's accidents, has been making some curious and interesting investigations. First, on what day of the week do most accidents occur? Secondly, at what hour of the day? He bases his generalizations on 1,071 cases of accidents which happened in his own district during 1897. Mondays and Fridays are the days when most accidents occur, because, according to his statement, the drinking shops are most frequented by workmen on the days previous—viz.: Saturdays, Sundays and Thursdays. Fewer accidents happen on Tuesday than on any other day of the week, because on no day are drinking houses so empty as on Monday. With reference to the hours of the day, Dr. Wolff states as an undoubted fact that the hours after breakfast, dinner, and the afternoon rest are signalized by most accidents. He attributes this to the lassitude caused by the work of digestion and to the use made by men of intoxicants during meal times. He also establishes the fact that in factories where the meal hours are greatly curtailed there is an excess of accidents over the factories where the men are more liberally treated in this respect. It remains to be seen whether his conclusions will be confirmed by investigations conducted upon a more comprehensive scale. —New York Post.

A Year's Work at the South Bethlehem Hospital.

Dr. W. L. Estes, physician and surgeon-in-chief of the hospital, read the medical and surgical statistics for the fiscal year, ending Sept. 30, 1898. His report showed that 570 house cases had been treated during the year; this included 52 remaining from the previous year, and seven children born in the hospital. There were 111 medical cases discharged, with seven deaths, and 416 surgical cases with 23 deaths. There were several cases admitted in hopeless conditions; substracting these, the general mortality rate was 4.79 per cent. During the year 308 operations were performed, not enumerating those in the dispensary. There were 15 deaths after operation, making the mortality rate 4.87 per cent. Among these were four hopeless cases, which, if eliminated, would give a mortality of 3.62 per cent.; 1,439 dispensary cases were treated, making 7,054 visits.—(Lehigh Valley Med. Mag.)

To remove a foreign body from under the nail, alternately soften the nail with the end of a match dipped in caustic potash and scrape with a piece of glass until the object is reached.

Volkmann's Antiseptic Liquid:

℞ Thymol .....part ½
Alcohol .....parts 5
Glycerin .....parts 10
Aq..... .....parts 50

Dissolve the thymol in alcohol, add the glycerin and then the water.

Old Journals.—Look back over them from time to time, and you will discover that you either never read them before, or that you have forgotten many valuable hints they contain.—Dom. Journal.

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A REMARKABLE CASE.

The London Lancet, which is the leading medical journal of the world, makes a very complimentary allusion in its number of November 12, 1898, to the case of lightning stroke, reported by Dr. C. F. Leslie in a late number of the Railway Surgeon. It justly styles the case "remarkable." We congratulate Dr. Lewis on this pleasant notoriety.

TRANSPLANTATION OF SKIN AND ORIGIN OF THE PIGMENT.

In a recent paper before the Chicago Academy of Sciences Dr. L. Loeb gave the details of some very interesting experiments. He used the ears of guinea pigs in his work, transplanting white skin on a wound in black skin and black skin on a wound in white.

Dr. Loeb found that the black skin adhered permanently, the white skin on the other hand only remained for a short time; the longest period was only four and one-half weeks. The transplanted white skin is thrown off after it has apparently united firmly with the neighboring tissue, as evidenced by cell division in the deeper layers and regeneration of the edges. The transplanted epithelial cells from the black skin migrate into the adjacent white skin, and vice versa, so black skin is finally substituted for white.

The author thinks these experiments prove that the black pigment originates through metabolism in the epithelial cells itself and not from being transported from the connective tissue, on account of the following facts:

The transplanted epithelium remained black or white, as the case may be, the cells each living on the tissue of the other, yet producing pigment in one case and none in the other, thus showing that the nourishment supplied the cell by the subjacent tissues has no effect on the production of pigment. The nature of the food needed by the cells to produce pigment is not known as yet, but there is nothing to prove that it is hæmoglobin.

The black epithelium when regenerated over white connective tissue, remains permanently pigmented. Finally, the originally unpigmented cutis on which black epithelium has been transplanted, or on which black epithelium has regenerated, becomes pigmented afterward.

Dr. Loeb promises further researches on the subject, which will be awaited with interest.

A perforation of the peritoneal wall of the bladder may be ascertained by drawing off the urine and then injecting a measured quantity of aseptic fluid into the empty bladder. If the bladder readily distends, and if in a short time as much of the fluid is withdrawn as was put into the bladder, the inference is strong that there is no perforation of the bladder. This evidence, of course, does not preclude a possible lesion of the ureter or pelvis of the kidney. —H. M. Taylor.

There is one point, in all abdominal work, which has impressed me very forcibly, the danger of infection resulting from numerous assistants. In Europe, many surgeons are satisfied with one assistant, and the nurse is not allowed to touch either instruments or dressings. In this country, on the contrary, we frequently see three or four assistants and as many nurses.—D. Tait.

Translations.

Temporary Craniectomy.

By M. Thomas Jonnesco.

(Translated for The Railway Surgeon.)

At a meeting of the Surgical Society of Bucharest M. Jonnesco presented several patients on whom he had performed temporary craniectomy by a modification of Doyen's method.

The first two patients were twin brothers, aged 25. Their illness was so similar in appearance, progress and cure that the two cases may be described together. In February, 1897, both patients had a febrile attack, with delirium and attempts at suicide; they were not able to speak. On February 18 they were admitted to my service in a state of complete prostration, and only answered questions put to them by signs; no discord of sensibility or of motion. On February 25 I performed temporary hemi-craniectomy on the left side in one, and the next day on the other. I found great œdema of the brain. A hæmatoma under the scalp impeded union by first intention, but the intellectual faculties returned somewhat quickly in both patients. They spoke rationally and answered questions perfectly. They have entirely regained all their mental faculties and are perfectly cured of their cerebral troubles.

The third patient was a young girl afflicted with epilepsy and idiocy; she had from one to three paroxysms daily, and her intellect was very dull. On Dec. 9, 1897, she was admitted to my service and three weeks later I performed temporary hemi-craniectomy on the right side. I found very marked milky patches in the meninges along the course of the vessels. I resected the cerebral cortex in the whole extent of the superior half of the ascending frontal and parietal convolutions. The cerebro-spinal liquid escaped for sometime and there was slight suppuration, otherwise the after course was uneventful and the wound healed at the end of a month. The paroxyms because much rarer and finally only occurred at intervals of several days.

The fourth patient was a man of 50, who had been hemiplegic on the right side for 17 years, also aphasic and with general epileptic attacks. He was sent to the Panthelimon Hospital with a diagnosis of probable cerebral tumor. In this case also I found many milky patches in the meninges along the vessels. There was no tumor in the cortex. A crucial incision was made at the apex of the motor zone for the arm, as this was more paralyzed than the leg. As even deep exploration here revealed no tumor I contented myself with extirpating the cortex over the whole arm center for an extent of 1½ to 2 inches. During this resection of the left cortex the right arm became very tremulous. The cerebro-spinal fluid escaped for a few days, then ceased. His general condition was much ameliorated, he has regained some movement in the right arm, and the epileptic seizures have disappeared.

The fifth patient, a man of 40 years, was admitted to my service Feb. 14, 1898. He presented a marked prominence in the left frontal region due to an ancient fracture of the skull, which was soon followed by attacks of general epilepsy, more or less frequent, sometimes twice daily. On February 25 I performed craniectomy in the frontal region, taking out one area 2½ inches wide above the orbital arch on the left. The dura was very thick, adhering both to the skull and the brain. The cortex beneath the fracture was retracted and markedly atrophied, so I resected a portion 2 inches in diameter. The wound healed by first intention, the seizures have entirely disappeared, his general condition is excellent and the patient has resumed his duties as porter at a railway station.—(Bull. et Mem. Soc. de Chirurg. de Bucharest, 1898, 25.)

When strapping a chest for fractured ribs, it occurs that, instead of affording relief, the pain is increased by the strapping. This is usually due to turning a broken end inward. In any case the dressing is to be removed and the patient must simply be kept as quiet as possible.—Int. J. Surg.

In a recent case of amputation of the upper third of the forearm for tuberculous disease of the wrist-joint, Dr. Young called attention to the fact that these cases are often recurrent, and to avoid this a high amputation should be preferred to a low one, particularly when the family history is bad.—Phil. Poly.

Extracts and Abstracts.

Treatment of Wounds.

By J. E. Summers, Jr., M. D., Omaha, Neb.

HEAD INJURIES.

Scalp Wounds.—A common impression prevails that scalp wounds differ much in their behavior from wounds in other localities, and therefore special rules of treatment are necessary. This is not so; all that is essential is a recognition of the anatomical peculiarities of the part and the care demanded to render the wound area free from germ-carrying materials. Some scalps are loaded with oil, dirt and epithelium, and when wounded require more than ordinary efforts to disinfect; however, a vigorous use of soap and water, alcohol and bichloride solutions, employed in the order named, will disinfect efficiently. It is usually wise to cut away the hair in the immediate vicinity of a scalp wound, and in all complicated cases a large area, perhaps the whole scalp, should be shaved and then thoroughly disinfected.

Incised Wounds.—Hæmorrhage should be treated as elsewhere, only it must be recalled that the rather broad and firm surfaces cannot bleed much if approximated by suture; hence few ligatures are required. After preparation, incised scalp wounds should be treated as skin wounds in other parts. Silkworm gut is the best suturing material, and the stitches should be introduced sufficiently close together to bring about accurate approximation, but not so close as in deep skin wounds in most other parts, where it may not infrequently be good practice to use superficial as well as through and through stitches.

The simplest wounds may be dusted with some protective drying powder without an overlying dressing, but as a rule the same practice as to the dressing of wounds in general should apply to scalp wounds. Stitches can be removed in from four to six days.

Scalp wounds resulting from falls, blows with clubs, canes, beer bottles, and the like, often resemble very much the ordinary incised wounds, only that they are apt to be irregular and the edges present a slightly contused appearance with a tendency to eversion. Such wounds require the same kind of treatment as incised wounds proper. They may be very extensive, especially when due to the head or long hair of women being caught between or in moving machinery. Large parts of the scalp have been torn off the skull or flaps of considerable size lifted up. In the former case an attempt should be made to suture the detached scalp in place with the hope that union will occur; this failing, in whole or in part, repair of the raw surface may be aided, after granulation has been established, by skin grafting. Flaps should be sutured carefully, and almost invariably it will be found that they will unite because of the abundant blood supply.

When a scalp wound is complicated by a deeper injury through the aponeurosis of the occipito-frontalis muscle, opening up channels for infection between the muscle and the pericranium, it is unwise to use stitches at all if the wound is a small one, and if a long one only a comparatively few stitches ought to be introduced, the reason being that if our efforts at disinfection have not been successful avenues of escape for the products of infection must be free, because septic inflammation of a most dangerous form may occur in the cellular tissues overlying the pericranium, and this infection invade the skull through the numerous veins connecting with the meninges, causing either an intracranial abscess or a suppurative lepto-meningitis; therefore, such wounds should not be tightly closed by suture, but they should invariably be drained. In case infection of the kind under consideration has taken place, the original wound must be reopened immediately; perhaps other openings may be required to establish free drainage. If a decided betterment, both in the local and constitutional condition (not infrequently of an alarming type), does not follow within a few hours at longest, the skull should be carefully inspected under and in the area nearest about the original injury, and it may be that pus will be detected coming out of one or more of the numerous openings connecting the exterior with the interior. Such a condition would probably demand the use of the chisel or trephine in order to limit or prevent by disinfection and drainage a fatal intracranial affection. Of course, if there are symptoms of mischief within the skull determinable by known means of cerebral localization, the chisel or trephine should be used over the recognized area, not forgetting, however, that that part of the skull immediately under the seat of primary injury, and where the greatest intensity of inflammation began, is the most likely portion for attack by the surgeon, who should not be lured away by symptoms seemingly pointing in other directions, unless they are of a positive kind. In acute intracranial inflammatory conditions many of our usually reliable localizing symptoms are untrustworthy.

Contusions of the scalp are common and result from the same class of injuries as scalp wounds following blows, falls, etc. In the majority of cases the swelling resulting from blood extravasation and exudation is limited and of little importance; all that is necessary in the way of treatment being the application

of very hot fomentations. Cold is a favorite remedy with many surgeons, but the writer's preference is for moist heat. If, as not infrequently happens, the patient complains of pain and a "hot, burning fever" in the head, the application of cloths wrung out of ice water or the use of the ice cap is most grateful.

Sometimes quite extensive hæmorrhage occurs under the scalp, causing large fluctuating swellings, which, fortunately, gradually disappear under the form of treatment just recommended. It is a good rule never to incise these swellings unless there are both local and constitutional signs of infection in the swelling, then free incision, antiseptic irrigation and the establishment of drainage are demanded. Occasionally a form of swelling following contusions of the scalp is met with which presents puzzling features to the young surgeon, and not invariably is the elder certain as to its meaning when perchance the sufferer may have received such a blow as to shake up his cerebral balancing powers to a degree that rather indefinite "brain symptoms" more than suggest the possibility of skull fracture with compression of the brain. This form of swelling is caused by hæmorrhage under the pericranium. It is a circumscribed swelling and is limited under and held in by the bones which it covers. Because of its exposed position, the parietal eminence is a favored seat for this swelling, which at first is soft in character, but soon assumes hard elevated borders, the central portions remaining soft. It is this ridge-like border which causes misgivings. To the fingers examining this edge and the soft center, the sensation of fracture of the skull with depression may be experienced. But when it is remembered that the edge of the swelling is raised above the bone outside the area of injury, and also that by firm pressure with the finger or some non-cutting instrument the border can be indented, of course the idea that fractured bone is being felt must be abandoned. The indurated border is due to a fibrinous exudation.

Swellings under the scalp are found in new born babes and result from difficult labor with or without instrumental interference. Mild forms of this swelling are extremely common and excite no comment, but the severer forms, especially the sub-pericranial variety, invariably cause great anxiety and apprehension upon the part of parents and family. The busy and inquisitive neighbor may stir up considerable of a rumpus if the attending physician does not quiet matters by an explanation and favorable prognosis. He should not fail to mention incidentally to some relative that in rare instances the brain is injured by the compressing force of the difficult labor, but as far as the external swelling is concerned, it is of little moment, and will disappear in a few days or a week or so. The treatment is as for ordinary contusions.—West. Med. Rev.

Poisoned wounds may be defined as a class of infections resulting from microbic, chemic or mixed bio-chemical infection, having certain special well recognized characteristics which vary in many respects, both etiologically and in their clinical course, from wounds as met with in everyday accidental and operative surgery.

Post-Mortem or Dissection Wounds.—An increased knowledge of the pathology of diseases and a better appreciation of the means at our command to prevent or control infections has diminished the frequency with which post-mortem or dissection wounds are met with, which give rise to symptoms of importance. A poisonous substance developed in a dead body may enter through a prick, cut or abrasion, and cause either a local inflammation or a rapid, more or less general blood poisoning. The poison, if derived from bodies of individuals recently dead, is more virulent than from those in the more advanced stages of decomposition, and in general it may be stated that the more decomposed the body the less the danger. It must be remembered, however, that Pasteur proved that certain diseases of animals (found in man also) could be contracted by healthy animals grazing over ground in which was buried the bodies of animals long since dead from these same diseases. Certain specific diseases can be inoculated from the bodies of individuals dead with these diseases.

Bodies dead from diseases such as erysipelas, septic peritonitis, and more especially the puerperal type are responsible for many of the most serious cases of post-mortem wounds met with, and inoculation from the living through the injured skin of the surgeon while engaged in examining or operating upon patients suffering from these infective diseases may cause the most serious mischief.

It is said that inoculation may take place through the unbroken skin, entering through the hair follicles, etc., but this is theory. No man who is actively engaged in using his hands in medical and surgical work can be sure that there may not be one or more abrasions or other minute passageways for microbic or bio-chemical poisoning. Ordinary ocular inspection may not disclose these channels, but they are present just the same from time to time.

Sir James Paget (Clinical Lectures and Essays) says: "For not all men can be made ill by a virus from a dead body, nor can the same man be made ill at all times, but there must be what is called a fitting soil for the virus to work in. We know no more what this soil is than we do what the virus is; we have to use figurative expressions; but we need not doubt

that they imply facts, and that for any living body to be made diseased by a dead one, there must be certain living materials which can be diverted by the dead ones from their normal relations and turned into a morbid course."

Two facts have been well recognized: First, a person whose duty calls him to make frequent post-mortem examinations can become almost immune against post-mortem poisoning; his system becomes protected against the virulence of poisons; second, a debilitated state of the general health predisposes to infection. The writer has seen many cases of infection of the hands among butchers, cooks and dishwashers, but these infections were almost without exception local in character and no death or dangerous constitutional conditions are recalled. Some of these people were quite ill and a few suffered serious local infections, but as the animal material handled by these people was from healthy sources, virulent poisoning was not to be expected.

Types of Post-Mortem Poisoning—Local.—As a result of constant local irritation of the hands by the juices of dead bodies a form of wart is met with which is somewhat analogous to the venereal warts caused by gonorrhœa and is described by Stanley Boyd as the "Dissecting porter's wart." It results from irritation and not infection, and is found upon the dorsal surfaces of the hands and fingers. There is no ulceration, but there may be cracks and fissures. The multiplicity of the warts distinguishes them from epithelioma.

An annoying, but not dangerous, form of local infection is often found upon the hands of students engaged in dissection and sometimes also upon the hands of physicians who not infrequently make post-mortem examinations. It consists in one or several pustules which develop upon the dorsum of the fingers and seem to select by preference the knuckle areas. These pustules are sometimes found upon the dorsum of the hands, wrist and lower forearm, and when found in these latter localities, usually take on the characteristics of small boils with perhaps rather extensive inflamed circumferences. Whether pustular or furuncular in kind, they tend to be quite chronic, and unless treated after an especial fashion, ulcerating surfaces form beneath the scabs of their dried secretions. Inflammations of a very chronic kind are also found around about and under the nails, the result of local post-mortem infection.

Treatment of Local Infection.—Warts are successfully treated by the use of caustics, and for those who must continue to expose the hands to irritation, this is the best treatment; the caustic must not be too powerful and perhaps glacial acetic acid applied every day or every second day is the best. It is said that the constant use of extract of belladonna is curative. When radical means are desired the warts should be removed with the scissors, the bases curetted, and to the raw surfaces pure carbolic acid applied. If the warts are numerous the action of the carbolic acid may be limited and pain much modified by mopping the cauterized surfaces with alcohol. A wet antiseptic dressing should be used and the probabilities are repair will soon take place. A boracic acid ointment dressing may be used with advantage as repair progresses. In some obstinate cases it is necessary to repeat the carbolic acid and alcohol applications. Where fissures and cracks complicate these cases the carbolic acid should be made to reach the bottoms of these separations. The pustules may be treated by opening them thoroughly, applying carbolic acid, and then a wet antiseptic dressing, or the pustules may be curetted out and then apply the acid and dressing; but it must be remembered that success in treatment depends upon the prevention of the accumulation of the irritating pus beneath scabs or dried dressings. Local inflammatory conditions involving the nails are types of purulent onychia. Suppuration takes place around about and also beneath the nail. The matrix will be affected in whole or in part, and as a consequence a part or all of the nail is loosened from its bed. The matrix is converted into granulation tissue. The condition is a painful one and apt to be slow in its repair.

In the early stages the tissues around the nail, usually on one side, ought to be incised and pure carbolic acid or nitrate of silver stick applied to the cut surface. As soon as it is clear that suppuration has or is about to occur under the nail a piece of the nail should be cut away and the infected surface beneath touched with carbolic acid. Wet antiseptic dressings ought to be used. Hot fomentations are grateful. In spite of prejudice by the profession, the patient will appreciate and be grateful for a hot, thick flaxseed meal poultice, mixed up by using a moderately strong solution of carbolic acid or bichloride of mercury.

The constitutional effects of post-mortem wounds are produced by the entrance of poisons, microbic, chemical, or both, into the circulation, usually through the lymphatic system. The severity of the symptoms depends upon the amount and character of the poison absorbed, as well as the individual susceptibility.

A septic lymphangitis makes itself evident usually within twenty-four hours after inoculation—there is pain and throbbing of the fingers and possibly arm. In a few hours red streaks may be observed running toward the nearest glands. If the infection is limited to the main lymphatics, these red streaks are isolated, otherwise all the lymphatics become involved and a more or less diffuse cellulitis develops, softened areas can be felt. In the isolated type of lymphangitis the spread of the

poison seems to be in a measure arrested by the glands along the course of the lymphatics. These glands, in order from below up, become swollen and painful and may suppurate. Diffuse suppuration of the axilla and even pectoral region may occur.

Constitutional symptoms may be profound; high temperature, delirium and marked depression is observed. Death occasionally follows this poisoning in from two to four days. Every post-mortem wound should be encouraged to bleed, and if there are no cracks upon the lips, it ought to be sucked. This will remove some, if not all, of the poison. The wound should then be cauterized with glacial acetic acid or carbolic acid, both of which drugs should always be at hand when post-mortem work is being conducted.

Simple isolated lymphangitis requires little treatment except the antispetic treatment of the point of inoculation. Hot fomentations, painting along the lymphatics with tr. iodine, or extract of belladonna and glycerine may possibly do some good.

Suppurating glands should be incised and all forms of cellulitis treated upon the principles already laid down. Drainage and supporting constitutional treatment are the keys to success.—West. Med. Rev.

Successful Operation for Relief of Traumatic Epilepsy.

By A. G. Servoss, M. D.,

Louis Wright, Jr., the subject of this article, was born about seventeen years ago. At the age of three years he was kicked on the head by a horse. The immediate effect resulting from this accident was a fracture of the frontal bone, exposing the brain, and leaving, after a tedious repairing process, not aided by the services of a surgeon, a scar the shape of a horse's shoe, seven inches long, involving the right half of the frontal bone, and extending about one inch to the left side of the median line.

No apparent ill-effects were manifested after this fracture had healed, and for ten years the boy grew and acted like other boys. About this time his parents discovered that he was having fits at night, resembling in all points the attacks of epilepsy, with which physicians are so familiar. Then all the neighboring physicians were consulted in turn, and various preparations of bromide given, all of which were productive of no permanent good, though temporarily of apparent benefit. The physicians were of the opinion that the injury of years ago had no effect on the child toward producing these attacks.

Physicians failing to be of assistance, various kinds of "Epileptic Cures" were next tried, one of which succeeded in keeping off the attacks for about one year, when the parents began to feel that the boy was nearly well. But soon he began to have his old trouble, and this continued in spite of liberal doses of the medicine.

About this time he came to the attention of the writer, and was rather an anæmic looking boy of about sixteen years of age, having nocturnal attacks of epilepsy about every fifteen to thirty nights, with gradual increasing intensity, the effects of which were beginning to be noticeable on the mind.

These attacks always began by a turning of the eyes to the left, a drawing of the muscles of the face to the left, with a gradual rotation of the head in the same direction, while in succession came movements of the left arm and side, after which the convulsions became general, lasting for a few moments, then followed deep sleep.

During these attacks froth issued from the lips, the tongue frequently was bitten and cyanosis was apparent to a marked degree. A diagnosis of epilepsy was made. Causes: Immediate pressure over first and third right frontal convolusions by some substance, probably bone. Remote: injury inflicted thirteen years before.

The extent of the scar made it almost necessary to locate the pressure with some degree of exactness, in order to avoid destroying an extensive area of the skull. The head was, therefore, shaved and the location of these convolusions determined with as much accuracy as possible. Prognosis very guarded, but parents were assured that everything that we could perform would be done toward a favorable result.

Operation June 1, 1897. Patient's head had been shaved, cleaned and rendered aseptic the day before, then covered with corrosive sublimate dressings; as well as all instruments in the office being boiled for one-half hour in soda solution after being thoroughly scrubbed. At the time of operation all these precautions were again enforced, and all care taken to render the operation strictly aseptic.

A large incision, semi-circular in shape, was made through the skin and fascia parallel with the scar and the flap reflected back, leaving the seat of fracture plainly exposed. After hæmorrhage had been checked and the periosteum raised wherever possible, a one inch trephine was inserted and a button of that size removed; some difficulty was experienced in removing the button, which was found to be due to a mass of callus on the under side, which was partly cut through. This callus was subsequently found to be oval in shape, one-half inch wide at its widest part, one inch long, and one-fourth inch or more in depth, making a depression in the brain substance,

which would have held about sixty minims of water.

The membranes covering the brain at the seat of operation being grown together and much disturbed in their relations were removed, except the arachnoid. The brain pulsating freely, and having no appearance of cicatricial tissue was not disturbed.

The original opening in the skull was enlarged for the purpose of inspection, till an opening oval in shape, one inch wide and three inches long, existed at the right side of the frontal bone. The hæmorrhage being fully checked the periosteum was brought into place and the skin flap stretched over the opening after first excising the scar tissue left from the original injury.

So carefully had absolute freedom from infection been maintained that in ten days we sent the boy home, six miles, without any bandage on his head, and the wound perfectly healed.

The subsequent history is particularly interesting, in that during the next sixty days the patient had three distinct attacks, one being a "double-header," making four distinct discharges in that length of time, and this while taking large doses of bromide. The last attack was on August 4, 1897, in the early morning hours, at which time we counseled the parents to give the operation six months to show for itself, after which time, if no good had resulted, we proposed to again open up the tissues and remove a part of the brain tissue. This, however, did not become necessary, for at this writing, June 1, 1898, he had not had an attack in ten months, and is taking five gr. bromide of ammonia in twenty-four hours.

My belief is that the attacks after the operation were due to the absence of the mebranes and consequent pressure of the skin flap directly on the brain tissue which would, I think, have been obviated by a sheet of gold leaf inserted in place of the dura and pia mater removed. Though perhaps they may be fully accounted for by the theory of habit.

Our patient has changed from an anæmic, fretful, nervous boy, to a stout, rugged, red-faced farmer lad and attends school regularly. Should the favorable results continue for eight or ten months more, I will feel certain, as does his family now, that a cure has been effected.

As baring on the necessity of having a room specially fitted for these operations, permit me to say that this operation was done in a country doctor's office on a common Harvard surgeon's chair, and at the end of twenty-four hours the patient was moved a mile, where he was kept the remainder of the ten days.—Med. Fortnightly.

Aseptic Surgery in the Country.

C. A. Peaslee, M. D.

During my fifteen years of struggle for existence as a country practitioner, a few cases of accidental surgery have come my way. My success with these cases prompts me to report them, not because the cases are uncommon or because any rare skill has been exhibited in handling them, but rather because they have been aseptic, when all of the circumstances surrounding them tended toward a different result. And because the average country physician is generally considered unable to do good surgery, especially aseptic, in the septic places in which he is called to operate.

The latter idea, however, should forever be banished from the minds of every intelligent person, for it is admitted by able surgeons that but a short time is needed to make a clean operating room in most any country house. Thus any case that can allow time for preparation can be cared for in one of these rooms quite as well as in a hospital. It is not this class of cases of which I wish to speak, but rather the accidents that demand instant action on the spot, and that spot may be a place, the sight of which will make you shudder when you think of the possible result of your work done there. At these times one has a chance to show originality and inventive ability. And unless the operator possesses these qualifications his patient must be the sufferer.

Case I: A man about 25 years of age, undertaking to stop the speed of a vessel with a rope, one end of which was fastened to a pier, while he was allowing the rope to run around a bit or post on the vessel. By some accidental step he got his leg caught in the rope and said leg became a part of the post while the rope continued to slide around it. Very soon after this I arrived upon the scene and found him lying upon the deck in a pool of blood, a most intense sufferer. Immediately taking in the situation, I asked Dr. C. H. Leuerton to give him ether where he laid. While this was going on I made an operating table of the top of the house, upon which a sail was spread. The cook was ordered to furnish an abundant supply of boiled water. By this time our patient was under ether and we gently placed him upon the extemporized table. Examination revealed a fracture (simple) at the middle third of right thigh. At the juncture of the middle with the lower third of leg (same leg) we found a compound comminuted fracture of both bones. All of the tissues down to the bones had been literally burned off at the back of the leg at the seat of fracture by the rope which has run around it. A most peculiar part of the accident was the fact that all of the toes except the second had been pulled off and

attached to them were from four to six inches of extensor tendons, which had been actually pulled from their sheaths. I was advised by the lookers on to amputate and was called a fool for not doing so. I decided to try and save the leg, having found by careful examination that the large vessels and nerves were intact. Hot water with bichloride was used plentifully, iodoform gauze, splints with proper bandaging and my patient was ready to be carried home. For three days we had a fight for life. The shock was intense, but finally we had the pleasure of seeing our patient rally.

This accident occurred in July and in October my patient rode out.

Never from the first was there a particle of fever, no pus, nothing but a clean, healing, granulating wound, and a most rapid, uninterrupted recovery. He now walks about with but a slight limp. His shoe is built up inside, and he declares his leg much better than an artificial one. The shortening is about one and one-quarter inches.

Case II: A hurried, indefinite call about nine o'clock at night to an island where an accidental shooting had occurred. It was a case of "didn't know it was loaded." It was, however, and the charge completely destroyed the ankle-joint and the lower ends of tibia and fibula. Patient, a woman, very weak from loss of blood, lying on a lounge in a very small room, the largest in the house, however. For light we had a very weak kerosene lamp. While Dr. S. C. Bickford was giving the patient ether I was making a very hurried search for something in which to boil my instruments. Being about to give up in despair, one of the daughters took from the oven a pan of biscuits. This pan was soon undergoing such a scrubbing as it never had before, and soon contained my instruments in a solution of soda, which was boiling vigorously. Now for an instrument tray. Nothing could be found, not even a large plate. Nothing but my bread pan could be found, which made an ideal tray, as results proved, with a sterilized towel spread on its bottom in a solution of carbolic acid. Sooner than it takes to write this was all of this work done. We amputated at the junction of the middle with the lower third, making an excellent stump for an artificial limb. The patient rallied well and this case, like my first, had no fever, no pus, nothing but rapid recovery. I dare say that bread pan bakes biscuits just the same as before its surgical use, with the exception that the biscuits are now aseptic.

Case III: An engineer, while working about some machinery, was struck upon the top of the head by a piece of iron which had become loose upon a rapidly revolving shaft. He was knocked down and was found insensible with a compound fracture of his skull. To all appearances he was dead. The wound was enlarged, several pieces of straw hat and other foreign matter were removed, and we found a depressed fracture to the extent of three-eighths of an inch over an area as large as a silver half dollar.

Assisted by Dr. Bickford, I trephined, elevating the depressed bone, packing with iodoform gauze. Our patient rallied well and has completely recovered. I am happy to say that he had no fever, no pus, nothing but rapid recovery. Dr. Bickford has had the care of the case, and he reports to me that at no time since the operation, now some forty-five days, has there been a single symptom to indicate that the man had an accident. The wound has healed and the man is ready for work again.

I could name many cases, such as operation for strangulated hernia, trachelorrhaphy, perineoplasty, dilating and curetting uterine cavity, ligation of hæmorrhoids and many minor operations, all without fever or anything but a strictly aseptic condition.

I fully believe these results are due not only to absolutely clean linen, but also to the use of very large quantities of boiled water as hot as it can possibly be used. Bichloride has always been used with this water, and I am willing to give to it its just credit. The water, however, has the warmest place in my heart, especially when it is hot, and it can always be obtained in the country. It takes but a few minutes to clean up a small place for an operation, and even in a hurried preparation for an emergency case one can always find these few minutes. I have heard Dr. John A. Wyeth of New York say, many times, that all he wanted was three or four feet clean around his patient and he would guarantee an aseptic case. I know of no excuse for some of the cases I have seen of sepsis following operations, especially of minor importance. If the public could be educated to an intelligent understanding of the matter, the careless, uncleanly surgeon would be left to wonder why people did not appreciate his skill. It seems to me that the Academy and its journal are doing just this work—educating the public to an intelligent understanding of these important matters, medicine and surgery.

I most sincerely hope the medical profession of Maine will appreciate the good work being done, and most loyally support the Academy of Medicine and its ever welcome Journal.—Jour. of Med. and Sci.

During the month of August the Baltimore & Ohio relief department paid $38,034.26 in benefits to 1,460 persons. There were 27 deaths, 514 cases of accidental injuries and 561 cases of natural sickness.

Surgical Cases of Special Interest Treated During the Past Year.

By Thomas H. Manley, M. D., New York.

While the sciences must necessarily constitute the groundwork of progressive medicine, anatomy, physiology, chemistry, pathology and bacteriology, each occupying an important sphere, yet the new beginner, who starts out on his career with no other guide than a crammed, ill-digested knowledge of these branches is doomed to early chagrin and disappointment. He has not yet learned the practical side of medicine, and until he does he is little more than a dangerous experimenter, bound to inflict much harm before he falls into the right path.

A glaring illustration of the wide difference between theories and practice we have recently beheld in our late war with Spain.

The credulous, unsophisticated amateur would assume from the many over-colored vaporings of enthusiasts that by the utilization of the latest acquisitions of science and art military medicine and surgery must be revolutionized and rewritten, our advances and improvement having been so great. But what are the facts?

Well, let us candidly confess the truth and admit that though 33 years have passed since the Civil War we have no evidence that in those three decades any great advances have been made in medical or surgical prophylaxis of campaign life. Antiseptics have sustained a bad setback, the mortality from abdominal section has been great, while those penetrating wounds of the peritoneum treated by the let-alone plan have generally done well.

Dr. Senn's late contribution from the Relief points to practically nothing new, and again comes the worst blow to sanitary science, our boasted mastery over the contagium is little more than a myth. Our panic-stricken commands at the front pitifully appeal to the government to transport their army north before the pestiferous diseases of Cuba blot them out, as neither hygiene nor medical art is competent to prevent or mitigate them. This short war has taught us, as the Madagascar campaign did the French, a practical lesson, and led us to question many things which our laboratory authorities would have had us believe were as fixed and immovable as the fabled laws of the Medes and Persians.

The practical or the clinical side of the healing art is its very soul and life. Let the novice witness the treatment of a half dozen fracture cases, and it will do him more good than a month's reading on theory and speculation. It is therefore of vital importance that our collateral studies of the cognate branches of medicine be illumined, leavened and strengthened by clinical studies and immediate personal observation.

The record of cases by an unbiased observer is always of interest and value, therefore in this instance, with the very limited space at my command, there will be noted a few cases of a class of lesions of more than passing interest.

FRACTURES.

During the past 12 months 53 cases of fracture have come under my care and notice.

It is a most singular thing, but the fact remains that of late years there has been neither in England nor America a real, up-to-date work on the management of complex fractures. Here the young man is quite at sea, for one author will tell him that immobilization is necessary from 1 to 3 months. He tries it on a fat old woman with an intracapsular fracture of the femur, and he is rewarded with a vast bed sore, and later, possibly, death. He next tries it on a Colles'. After a month, when the fixation is removed, he finds every joint carpal and digital anchylosed. Turn again to a French surgeon's late work on fracture treatment and we will find that he urges the ambulent treatment with no splints at all, and motion with massage from the very first day.

The fact is that the proper treatment of fractures in general is a science in itself, of which the profession as a whole know very little. But few are familiar with Ollier's monumental work on this topic, or the fact that a fracture, like a lesion through the soft parts under proper treatment may, often do solidly unite by primary union. My course in fracture treatment is based on simple fundamental principles, the most cardinal being not to in any manner embarrass the circulation.

Our greatest and most substantial advances in this direction have been through utilizing osteoplasty in compound fracture, and the application of prothetic apparatuses. An enormous gain, too, has been possible by embalming all serious shattered fractures until the demarcating line is formed, if it form at all; in other words, dispensing in toto with primary amputations. It has been my invariable custom in all fractures, simple and compound, not to apply any permanent adjustment until all inflammatory reaction has subsided.

The Roentgen rays have been an aid in some cases, but there are many non-displaced fractures about the joints where its revelations are most delusive or negative. As a diagnostic aid in fractures its value has been rather overestimated.

One of the most serious cases of fracture of a large bone shaft that has come under my charge this year was sent to me by my friend, Dr. R. H. Cowan, the chief surgeon of the Norfolk & Western Railroad. The young

man 13 months before had sustained an extensive compound comminuted fracture of the right femur, with several other serious injuries of the body.

He finally made a good recovery, but at the side of fracture there remained a cushion joint, with a sharp, angular deformity, rendering the limb both painful and useless for support.

It was simply a question between amputation and restoration of position and function by some osteoplastic operation.

He was a young man with a fine constitution, and hence there was no doubt about the presence of ample regenerative action in the tissues. But the femur is the one bone shaft which is exceedingly intolerant to mechanical manipulation, after a recent fracture, although for pathologic states we may accomplish much through surgery. Briefly, it may be said that an operation was performed, an exceedingly difficult and bloody one, by which all the diseased bone was removed and the ends of the fragments solidly wired. The case was followed an uneventful course, promising to yield the happiest results as to position, strength and function.

CASES OF TRAUMATIC AND PATHOLOGICAL CONDITIONS OF THE EXTREMITIES.

A brief notice only here can be given to certain inflammatory conditions of the joints, traumatic or pathological.

More than one hundred cases of this class have been handled at my clinic in dispensary, in hospital and private practice within one year. A little more than a third were traumatic, about a quarter either tubercular or syphilitic; there were seven gonorrhœal, the remainder were of a neuralgic or rheumatic character.

The unsatisfactory results in the treatment of this class of cases often arises from two causes. The first is an imperfect knowledge of the anatomy of the extremities, and the next is through a hasty or imperfect investigation into the causation. For example, how often one is treated for synovitis when the effusion is inflammatory and entirely external to the joint in a neighboring bursa? And how often may a gonorrhœal or tubercular arthritis be confounded with rheumatism. Again, it is now well known that articular degeneration may have its source in the spinal centers.

Late years have witnessed a marked backsetting in those extensive dissections of joints so recently practiced on the articulations.

Arthrotomy in my practice has been proved to be very rarely required. Young children outgrow many joint lesions. In adults tubercular arthritis very often co-exists with pulmonary implication.

A large proportion of the cases coming under my care were entered for the relief of pain and stiffness in the joint. In many the dominant surface features pointed to rheumatism, though the history indicated trauma. This is an important point to note, for my experience has forced me to believe that in many of a gouty or rheumatic diathesis a trivial injury of an articulation may stir into activity a rheumatic, chronic inflammation. It therefore follows that in many of these constitutional treatment must go hand in hand with local measures.

For local treatment in the majority of cases of joint pain nothing is so prompt and decisive in its effect as acupuncture, followed by accelerating the joint action and bandage support. As a liniment nothing excels for these cases the following, first employed in this country by myself. It sometimes seems to almost work wonders:

℞ Acidi salicylici.....dr. iv ss
Tr. opii.....dr. iii
Spts. vini rect. dil.....oz. ii
Ol. terebinthin .....oz. i
Ol. dulcis, qs. ad.....oz. viii
M. Sig.—Liniment.

We must eliminate the opium tincture in growing children. It may be applied by inunction or by saturated flannels. The hand must be well oiled, which is to rub it in.

TRAUMATISM INVOLVING THE MUTILATION OF THE JOINTS AND SOFT PARTS—CASES.

A large number of injuries involving fleshy parts have been seen during the past year, most of them being lacerated or fractured and attended by contusions.

It strikes one as rather remarkable that young practitioners will persist in sewing up lacerated wounds. Imbued with a profound conviction that provided only a wound is amply scrubbed and pickled in an antiseptic solution, immutable and fundamental laws of surgery may be ignored with impunity.

An example of this came under my notice very recently.

A high official of this city, rusticating with his family in the Catskill Mountains, one morning mounted his horse for a ride. The animal shied at an object and became unmanageable, when the rider was thrown off, sustaining a deep, lacerated wound over the metacarpo-phalangeal joint of the little and ring fingers, right hand. The gash bled very freely. He was promptly attended by a physician, who immediately sealed the opening with deep suture. Three days later, as serious symptoms were developing, he was brought home. The following day I was invited by his New York physician to see the wound. Things now were indeed in a menacing state. His hand was bloated up, the sutures had ul-

cerated out, a purulent tendo-vaginitis had extended into the deeper part of the hand and the first phalanx of the little finger was bare on its inner aspect. Along with this he had a temperature of 104, with recurring rigors and bodily weakness. Incisions, counter incisions, irrigation and drainage were employed, while he was plied freely internally with whisky and quinine. He had a narrow escape from losing the hand, but the little finger had to be amputated.

In some of these cases of lacerations of the hand, in the summer season, unless prompt and efficient remedies are supplied gangrene may set in with destructive energy and destroy, with appalling rapidity.

Some years ago after a deep laceration of the palm by a butcher's hook, in which the wound was sewed up within 36 hours, mortification had set in so rapidly and extensively that I had to amputate at the humerus scapular articulation at the shoulder to save life.

The most valuable of all remedies for all deep lacerations are cold alcoholic solutions, but always leave the wound widely open.

Another mistake in treating lesions which open into the joints or involve a fracture of bone is the employment of strong antiseptic solutions, which by their irritating properties often start up a low grade of endosteal or perichrondrial inflammation, difficult to subdue without resort to resection or amputation.

RESUMÉ AND SPECULATIONS.

Let no one delude himself into supposing that any advances, no matter how great, during the past 25 or 30 years have in any manner revolutionized the fundamental principles of surgery.

A greater latitude of action is now possible, through anæsthetics, by which our patient is rendered temporarily dead to all sensations. and our work is not entirely unlike an autopsy. This permits leisure, accuracy and precision, without which progressive operative surgery would be impossible.

Lister taught the world the doctrine of cleanliness; the inventions, industries and discoveries of modern times have contributed vastly to progressive and special surgery, and as above than all, the masses have torn loose from the chains of the despot, the democratic spirit has taken deep root, and poor, struggling humanity is now permitted to enjoy some of the fruits of toil and labor; everyone is better fed, domiciled and clothed, and the accursed "famine fever" of former times is no longer possible. Therefore why the patient stands the shock of operation with comparative immunity and the death rate has been enormously lessened.

PROPORTION OF SURGEONS TO THE WHOLE NUMBER OF PRACTITIONERS.

The number of surgeons, general and special, has enormously enlarged during the past 20 years, but it must enlarge more yet to meet the demands of the times. In fact, except for infectious diseases, there is now little call for the physician. Medical nihilism is rampant, and surgery has come in to swallow up all the plums in practice.

With this keen competition, the one maintaining himself by surgery exclusively must needs exercise a ceaseless vigilance, combined with continued autopsy work, vivisection and a practical knowledge of his art through incessant application and observing not only the methods of different operators and their brilliancy in execution, but their faulty judgment, their errors and mistakes.

SIMPLICITY IN TECHNIQUE.

Although there are not a few excellent surgeons who leave nothing undone for dramatic effect in playing to the house, the keen critic and even the intelligent layman soon sees through it, and it rather serves in the end as a boomerang.

What we need is not a great array of instruments and a large retinue of begowned assistants, but a few thoroughly good and reliable ones.

PAIN AND SHOCK.

The immediate mortality from operative surgery comes from pain hæmorrhage shock. Pain is a monitor which must be heeded and not stifled by narcotics until its cause is clearly unmasked. Operative pain is no more, since we have anæsthetics and analgesics. But it is better not to risk anæsthetics unless an operation is to be protracted, or very painful.

In all surface or peripheral operations now we have in cocaine one of the greatest boons every conferred on humanity. Let the practitioner master well its technique in surgery. Hæmorrhage is what always tries the mettle of the operator. Very many sink after operation from great loss of blood. Blood is our very life itself. Economy of it in surgery contributes more toward salutary results than any other single factor in operative surgery. —Times and Register.

In non-penetrating wounds of the abdomen we may have considerable bleeding from injury to the circumflex iliac, internal mammary and epigastric arteries. If the wound be penetrating, remember that the same cause of hæmorrhage may be at fault. Such superficial hæmorrhage should be looked for and checked. but no probing can be allowed. Non-penetrating wounds may, of course, be infected, and give rise to serious sepsis, with typhoid symptoms, etc. They are to be treated as anyhere else.—Int. J. Surg.

Trauma a Cause of Appendicitis.

By William B. Small, M. D.

On every hand we hear the query, "Why is there so much more appendicitis to-day than ever before?" Answers to this query are not very satisfactory. The medical profession takes credit to itself, and says, "We are much better able to make the diagnosis." But this hardly explains the half of the increase. It would take many times all the cases of peritonitis, perityphlitis, and paratyphlitis of twenty years ago to equal in number the cases of appendicitis of to-day. To find a satisfactory explanation of this increase in all its phases we must study more carefully the causes which lead to the inflammatory involvement of the appendix. In this way alone can the true solution of the question be reached.

The idea is gaining ground that the appendix is anatomically a glandular organ. Among foreign writers especially it seems to be considered somewhat analogous to the tonsils. Its disorders then would be like those of the tonsillar bodies—follicular, mucous, submucous, infectious, exudative, and ulcerative. To continue the analogy, it is doubtless a fact that, as in the tonsils, the local inflammation of the appendix is caused by micro-organisms, specific or non-specific.

It has been demonstrated that the particular cause of the inflammatory process in the appendix is the bacillus coli communis, though in a certain proportion of cases other micro-organisms, especially the staphylococcus pyogenes and streptococcus, are also found.

These germs may gain admittance to the appendix in the intestinal fluids, or more frequently with irritating fæcal matter in hard egg-shaped concretions of various sizes, introduced into the appendix from the cæcum by force of pressure. Foreign bodies (cherry stones, orange seeds, spicules of bone) are more rarely found in the lumen of the appendix, but all come from the same source (the cæcum) and in the same way, by being forced in. The irritation of the mucous membrane by these hard substances furnishes a foothold for the bacilli—staphylococci and streptococci—to multiply and perform their destructive work.

Why this condition should occur so much more frequently during recent years is not uniformly explained. We are told by some observers that the valve over the end of the appendix is defective. The existence of this valve is not universally admitted, much less its defective condition.

Some assert that the existence of intestinal catarrhal conditions in connection with the grip is responsible for the large increase of appendicitis in the past few years. This point seems to be proved from figures quoted by Goluboff,[1] who states that in Moscow, during the spring, summer, and autumn of 1896, the number of cases increased to four or five times the average of the past ten years.

While this explanation seems the most satisfactory one that has come to my notice as far as the general increased prevalence of the disease is concerned, there is another point in this connection which demands further attention.

All who have studied the disease agree that the majority of cases are found in young adult males, a majority so large that they furnish seventy-five to eighty per cent. of all cases. About seventy-five per cent. of all patients are under thirty years of age. These figures are significant. Occurring in other diseases, surgical or medical, we have been taught to explain such prevalence by the fact of greater liability to the predisposing cause or more frequent exposure to the exciting cause. Clinical observation and experience show this theory to be well sustained. Does it apply as well to appendicitis?

The fact that some part of the contents of the bowel nearly always furnishes the exciting cause of appendicitis makes it but logical to seek the explanation why this material should be forced from the colon into the appendix. It is reasonable to suppose that muscular contraction will produce this result. But why should the cæcum undergo such contractions more often in the male than in the female? I believe there is a sufficient explanation behind all this. I believe the true cause of the greater percentage of occurrence in young men is found in their more frequent exposure to accidental injuries and strains, and to the strong contractions of the abdominal muscles necessary in their work, thus, in either case, producing great pressure on the contents of the bowels; of this compression the cæcum receives its full share, being on the right, and usually more active side of the body. This result is but natural, and is in accordance with the principle I have stated, which is well recognized in other medical and surgical subjects.

That such a cause is sometimes hard to trace is but a natural result from the time required for the production of local inflammation from the concretion, and for the development of the germs in sufficient quantity to produce an effect so great as to be recognized by symptoms. This interval will be apparent to you as you listen to the cases I will report.

In the literature of appendicitis traumatism is mentioned as an infrequent cause. I have

1. Berliner Klinische Wochenschrift, January 4, 1897.

been able to find but one case reported with this the only cause. This case was that of a boy of sixteen years, who was struck in the right iliac region by the handle of a pushcart. A distinct tumor in that region occurred; the tenderness was most acute over McBurney's point. The tip of the appendix was found gangrenous. This case was reported by Dr. W. S. Coley in the Medical Record of February 15, 1896.

Much like this, however, is a case reported in the New York Medical Journal of October 24, 1896, by Dr. D. C. Moriarta, in which a pin was found in the appendix, having been there a year without producing trouble, until inflammation was lighted up by a blow.

Rutherford Morrison, in the Edinburgh Medical Journal, March, April and May, 1897, concludes that a strain may apparently originate an attack, a point which he considers of medico-legal importance.

My attention was first called to traumatism as a cause of appendicitis in the autumn of 1894, when I was called to see a young man unmistakably suffering from appendicitis. Two days before, while attempting to pry up a heavy stone by bringing his weight down on an iron bar while holding it between his thighs with his hands, he lost his hold and the bar struck him a heavy blow in the right iliac region. During the two weeks following he passed through the usual phases of an attack of appendicitis, with tenderness at McBurney's point, large, plainly defined tumor in the right iliac region, etc. He recovered without operation and has had no second attack.

The second case that was plainly of such origin was that of a boy nine years old. This case occurred in November, 1896. I saw the boy very early in the attack, but could not get from him any history of injury till my second or third visit, when he admitted that the pain first came on while he was playing and pushing a heavy two-horse dump cart by the tongue. The cart was hard to move, so he put the end of the cart tongue against his "belly," his hands farther up toward the cart, and pushed "hard." This occurred about twenty-four hours before my first visit. The abdomen was opened on the fifth day and a quantity of pus found. The appendix sloughed away. The child recovered fully.

The third instance of traumatic origin was in a young man, a carpenter. This occurred in June, 1897. In lifting boards from a pile and handing them up to a man above him on the second-floor staging, in order to expedite matters he used his groin as a fulcrum, applying the power by taking hold with his hands, two feet or so from the end in his groin, and lifting. This brought a great pressure across his bowels upward and toward his backbone. In less than forty-eight hours the symptoms of appendicitis began. The course of the disease was typical, and fair recovery was made without operation.

This patient fell under my care because his own physician was ill and unable to attend him. Some three months later a second attack occurred under the care of that physician, by whom appendectomy was promptly performed. The genuineness of the first attack was then proved in the thickening of the omentum and the adhesions of the neighboring parts. Pus was also found. His recovery was rapid and uninterrupted by any adverse symptoms.

I have reported to you those cases which have come under my own care in which traumatism as a cause was plain. Several others in this vicinity have come to my knowledge, histories of some of which I will outline.

Dr. J. A. Donovan of Lewiston has given me the details of a case of appendicitis occurring several years ago, in which a boy, about ten years of age, was thrown down and one of his playmates jumped on his abdomen. The immediate pain was great, but soon subsided sufficiently for him to get home. Three days later the doctor was called and found a tumor in the central pelvic region, which was opened through the rectum. Pus and two enteroliths escaped, the cavity was washed and drained, and the boy recovered.

Dr. John Sturgis of Auburn relates a case in a boy of eleven years, who was kicked in the abdomen by a horse on Wednesday or Thursday. On the following Sunday appendicitis developed. The abdomen was opened and the diagnosis confirmed. The patient afterward died of general peritonitis.

Dr. F. L. Dixon of Lewiston details a case in a man, twenty-seven years old, who fell through a trap-door seven or eight feet into a cellar. He complained of injury to his right side, but was not sick enough to send for a physician. This feeling of discomfort continued for two or three weeks, when symptoms of appendicitis appeared. Dr. Dixon was called on Friday. The diagnosis was made on Saturday. Sunday night the patient suffered severe pain and became collapsed. Incision made on Monday showed the abdomen full of free pus. Two enteroliths were found in the appendix and a gangrenous portion between them. Death occurred in a few hours.

The same physician, in January, 1897, operated on a man, thirty years of age, in an advanced stage of appendicitis. Old adhesions were found, in keeping with the history of repeated attacks. The man died a short time after the operation. Though no history of violence was obtainable at that time, several months later the following facts were re-

lated by the patient's mother In the summer of 1896, when on a small island, the patient, in jumping from one shore to another, felt a sudden sharp pain in the right iliac region, so sharp as to make him lie down. He was a long time in getting home, having to lie down often to rest. He was about the house for several days before he was able to return to his work. Between that time and his last illness he suffered from three or four attacks.

[*Concluded in next issue.*]

Railway Miscellany.

Heavy Locomotives.

In a period of a little less than two years there have been placed in service five groups of locomotives, the individuals of each of which groups were successively known as the "largest" locomotives yet built. First there were the 12-wheel compounds built for the Northern Pacific by the Schenectady Locomotive Works. Then the consolidation engine built for the Mexican Central road by the Brooks Locomotive Works. Then the 12-wheelers for the Great Northern line by the same builders. Then the consolidation engines built by the Pennsylvania Railroad company at its Altoona shops; and, lastly, the consolidation built by the Pittsburg Locomotive Works for the Union Railroad company of Pittsburg.

Each of these engines has been illustrated and described in The Railway Age at the time of its introduction to service. They are, however, taken together, so typical of the tendencies of modern locomotive construction, that it may be of interest to place side by side for purposes of comparison the principal dimensions of each. These are given in the accompanying table:

	Nor. Pacific 12-W. Schenectady.	Mex. Cent. Consol. Brooks.	Great Nor. 12-W. Brooks.
Weight	186,000 lbs.	193.450 lbs.	212,750 lbs.
Cylinders	23 & 34x30 in.	21x26 in.	21x34 in.
Boiler, diameter	72 in.	78 in.	78 in.
Tubes, number	332	412	376
Tubes, diameter	2¼ in.	2 in.	2¼ in.
Firebox, length	120⅜ in.	120 in.	124 in.
Firebox, width	42 in.	37¾ in.	40½ in.
Working pressure	200 lbs.	180 lbs.	210 lbs.
Heating surface	2,943.41 sq ft.	2,803 sq. ft.	3,280 sq. ft.
Driving wheels, diam.	55 in.	49 in.	55 in.

	Pa. Consol. Altoona shops.	Union R. R. Consol. Pittsburg.
Weight	218,000 lbs.	230,000 lbs.
Cylinders	24x28 in.	23x32 in.
Boiler, diameter	70½ in.	80 in.
Tubes number	369	355
Tubes, diameter	2 in.	2¼ in.
Firebox, length	120 in.	120 in.
Firebox, width	40 in.	40¼ in.
Working pressure	185 lbs.	200 lbs.
Heating surface	2,997 sq. ft.	2,322 sq. ft.
Driving wheels, diameter	56 in.	54 in.

With one exception these engines are designed for special service either as "pushers" on mountain grades or in situations of a similar character. The Northern Pacific locomotives are in service as helpers on a grade 17 miles in length and 116 feet to the mile between Helena and Missoula, Montana. They were designed to develop 1,200 horse power at a speed of 16 miles per hour. The Mexican Central engine was built for and is used in mountain service. A peculiarity of its construction is a provision for enabling it to use either wood or bituminous coal for fuel, there being on the line a large available supply of mesquite, which produces an intense heat. The service of the Great Northern engines is similar to that of the Northern Pacific engines, on heavy grades of mountain divisions. The line over which the engines of the Union railroad operate connects the Duquesne furnaces, Homestead Steel Works and Edgar Thomson Steel Works—being a part of the Carnegie system. Some four miles of this line has a grade of 70 feet to the mile.

The Pennsylvania locomotive alone is considered by the officials of the road as a road engine. They are being used primarily on the divisions having grades of 40 feet to the mile, but upon the completion of the equipment of 100,000 pounds capacity cars, some 3,700 of which are built or under way, it is the intention to use these heavy engines on the lighter grades, the new large capacity car equipment enabling trains to be made up to the capacity of the engines without at the same time being too unwieldy to handle.

The stockholders of the Wilmington & Weldon, a part of the Atlantic Coast Line, have adopted a resolution providing for the establishment of a voluntary relief department for the employes of the road, similar to that now in operation on the Pennsylvania railroad. The department will extend over the entire Atlantic Coast Line system, and Dr. G. G. Thomas of Wilmington, N. C., will be chief surgeon and superintendent of the department.

At a union meeting of railway employes in Norfolk, Va., this week, Grand Master Sargent of the B. L. F. stated that the brotherhood proposed to begin a campaign against the employment of negroes as firemen, for the reason that the latter stand in the way of securing remunerative wages for white firemen in some parts of the South. He stated that on some southern roads firemen now receive but $30 per month, and when they ask for an increase in wages, they are confronted with the fact that colored men could be secured who would do the work for $25 per month. Mr. Sargent explained that no violation of the law was contemplated, and that no threats were made, but that the campaign would be inaugurated in the interest of self-protection,

and that other meetings would be held to continue the agitation of the question.

Some Baltimore & Ohio History.

The chronology of the Baltimore & Ohio Railroad is interesting at this time, as it will not be many months before it will cease to be operated under the original charter. The first general meeting of citizens, contemplating the building of a railroad to the Ohio river, was held in Baltimore on Feb. 12, 1827. The other important events occurred as follows:

Act of incorporation granted by Maryland, Feb. 28, 1827.

Act of incorporation confirmed by Virginia, March 8, 1827.

Requisite amount of stock for organization subscribed by April 1, 1827.

Company organized; directors elected, April 23, 1827.

Preliminary surveys begun, July 2, 1827.

Actual surveys begun Nov. 20, 1827.

Charter confirmed by the state of Pennsylvania, Feb. 22, 1828.

Maryland became a stockholder, March 6, 1828.

Cornerstone laid, July 4, 1828.

Railroad opened to Ellicott's Mills, 14 miles (horse power), May 22, 1830.

Trial of the first steam locomotive on the Baltimore & Ohio railroad, Aug. 25, 1830.

Railroad opened to:

Ellicott's Mills, 14 miles (steam power), Aug. 30, 1830.

Frederick, 61 miles, April 1, 1832.

Point of Rocks, 69 miles, April 1, 1832.

Harper's Ferry, 81 miles, Dec. 1, 1834.

Hancock, 123 miles, June 1, 1842.

Cumberland, 178 miles, Nov. 5, 1842.

Piedmont, 206 miles, July 21, 1851.

Fairmont, 302 miles, June 22, 1852.

Last spike driven; finished, Baltimore to Wheeling, 379 miles, Dec. 24, 1852.

First train reached Wheeling from Baltimore, Jan. 1, 1853.

Railroad opened, Baltimore to Wheeling, 379 miles, Jan. 10, 1853.

In his annual report for the year ending June 30, President Ashley of the Wabash has the following to say in regard to the rate problem: "Railway companies in the United States are still struggling with the difficulties of unregulated competition, and while there has been manifest improvement in the volume of traffic, and, consequently, a fair increase in net profits, it is still quite evident that the rate problem is as far from a satisfactory solution as ever. It is not so much a question of what the rates should be as how they can be maintained when agreed upon, and against this obstacle the companies involved are constantly stumbling, much to the embarrassment of associated lines, and to the discontent of shippers. Congressional relief, which can be furnished by legislative amendment to the interstate commerce law, has hitherto been sought in vain, and the railway interests of the country have thus been jeopardized by a neglect which it is difficult to comprehend or excuse. The complicated machinery of inland transportation is allowed to work under laborious and unsatisfactory conditions, to the exclusion or indefinite postponement of improvements in harmony with the progressive spirit of the times, and yet public clamor is at once aroused if there is the least failure in service or in the accommodation of travelers. Looking to the future growth and prosperity of the country, and the close connection of the transportation interest with that expansion, it is to be hoped that congress will see the necessity of removing useless restrictions in the interstate law, in view of a senseless and uncontrollable competition, which, while encouraging unjust discrimination, cripples railway enterprise, limits railway extension and renders it impossible to continue improvements which the public good demands.

Under the order of the Interstate Commerce Commission granting extension of the time for equipment with brakes and couplers, it was provided that the railway companies should furnish to the commission semi-annual statements showing the progress of the work. The commission has this week made a brief announcement of the showing made by the first reports received in accordance with this order. Of 294 railway companies effected by the order the reports of 290 show that on June 1, 1898, they owned 1,153,290 freight cars, being an increase of 20,567 during the year. There are 119,614 freight cars reported equipped with automatic couplers and 67,202 reported equipped with train brakes during the six months ending June 1, 1898, which makes a total of 792,443, or 69 per cent, of the freight cars equipped with automatic couplers, and 510,636, or 44 per cent, equipped with train brakes up to June 1, 1898. Of 32,323 locomotives owned June 1, 1898, there are 29,102, or 90 per cent, which are equipped with driving wheel brakes. There are 360,847 freight cars out of 1,153,290, or 31 per cent, that are still unequipped with automatic couplers, 642,654, or 56 per cent, that are unequipped with train brakes, and 3,221, or 10 per cent, of the locomotives unequipped with driving wheel brakes up to June 1, 1898.

Negligence in failure to sound whistle within 300 yards of crossing is not cured, as a matter of law, by sounding it at a distance of 484 yards. Simons' Adm'r v. Southern Ry. Co. (Va.), 31 S. E. 7.

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THE "PELVIC BRAIN" IN DISEASES OF THE PELVIC ORGANS.*

BY ANDREW L. FULTON, M. D., KANSAS CITY, MO.

To discuss understandingly the close relation between the pelvic viscera on the one hand and the vessels and nervous apparatus on the other, we must have a clear understanding of the anatomical relations of the pelvic organs, together with the anatomy of the vessels and nerves that supply them. It is also quite necessary to associate the physiology and pathology with our anatomical study to give us a clear conception of what is proposed to be discussed in the remarks upon the subject of my paper. The phrase "Pelvic Brain," while coined by those who first referred to it, to my mind means a great deal that is not yet known.

I trust that this association will not look upon me as attempting to assume the rôle of the pedant when I attempt to demonstrate briefly the anatomy of the pelvic vessels and nerves, the better to enable me to be understood in treating of the physiology and pathology.

The location and the close proximity of the genital organs to each other and to the rectum need no demonstration, as all are familiar with the gross anatomy relating to them. The vascular supply, with its peculiarities, the complex character of the nerve supply, together with the intricate vaso-motor nervous system, so largely distributed throughout the pelvis, and of which we know so little, are subjects which I shall dwell upon more fully. It is the function of this last named nervous system, so largely supplied to the pelvic viscera, that I would be pleased to learn much more of. The disturbance of the equilibrium of the viscera in the pelvis, and of the blood supply, falling most heavily upon the cerebro-spinal and sympathetic nervous systems, induce a train of symptoms that are far reaching, and often remote, in results.

I have for many years looked upon the sympathetic nervous system as responsible for many ailments that are supposed to originate in some of the organs. Particularly have I been impressed with the belief that the pelvic plexuses and their nervous connection in the pelvic cavity have a powerful influence over other parts of the body, near and remote, through their so-called reflex nerve impulses. I am, furthermore, constrained to believe that the ganglia of the sympathetic system are endowed with trophic as well as vaso-motor functions that are controlled through nerve centers connected with the ganglia of the sympathetic nervous system. The vegetative function of the sympathetic system seem to me to be reasonable, although probably not susceptible to positive proof. If this is true the organic or vaso-motor nervous system should be raised to the dignity of being called the "pelvic brain." The vastness of the plexuses of the pelvis can scarcely be contemplated, particularly the venous plexuses and the sympathetic plexuses with their chain of ganglia connected together, and connected with the sacral plexus of the spinal nerves.

The veins of the pelvis are not only numerous, but have other peculiarities. The anastomosis is extensive and frequent and they come together at right angles and acute angles. Most of them are of very large size and many of them have no valves. The aggregation of the veins into plexuses is much more extensive than the arteries, and from a mechanical standpoint it is easily seen how they are made to suffer more frequently. Among the larger plexuses are the hæmorrhoidal, which are tributaries to the vena cava and portal system. The inferior hæmorrhoidal veins and the obturator empty into the inter-

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nal iliac veins. On the left side there is an anatomical peculiarity which tends to retard the flow of blood through the lower pelvic region, namely, the pressure of the right common iliac artery upon the left common iliac vein, which it passes over almost at right angles. This furnishes one good explanation for the fact that the left side of the cavity and left lower extremity suffer more frequently than the right.

Another anatomical feature of the pelvic veins worthy of note is that they are generally valveless, thus materially favoring venous

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congestion in a mechanical way. Again they are all situated in loose connective tissue and therefore have very little support; indeed, much less support from surrounding structures than most other veins have; on this account they are less capable of resisting increased blood pressure. Gravitation also favors congestion of the pelvic viscera by dilating the veins and thereby weakening the muscular wall. Another strong reason for pelvic congestion is the absence of valves in the portal veins; hence we are liable to have more or less passive congestion and dilated and varicose veins following disturbance in the portal system. A congested liver alone may afford a formidable disturbance in the pelvic viscera in a purely mechanical way.

When we come to consider, in addition to the anatomical factor in causing passive congestion of the pelvic organs, a much more serious one—a pathological—we find ourselves confronted by complications that promise to be far-reaching in their results. It is not difficult to understand, when we take into consideration the intimate and close relation of the pelvic viscera; the free anastomosis of their vessels; their large size and great number; how serious and how widespread the result of infection may be.

The venous system is by no means alone responsible for pelvic diseases. It is only from a mechanical standpoint that it can be charged with the cause; we have other elements of much greater danger. The lymphatic system must not be lost sight of in this connection. As the aider and abettor its part in the diseased process is at once manifest as soon as the pathological element has intruded itself into the conflict. These absorbents are everywhere to be found, accompanying the most minute capillaries. The point of a needle cannot penetrate any tissue that it does not wound lymphatics (except, of course, bloodless structures). They are deeply concerned in every morbid process occurring to the viscera of the pelvis.

A greater and more complex system—a prime factor in pelvic ailments—is yet to be considered, namely, the nervous system. We have here two distinct systems possessing different functions, viz., the cerebro-spinal and the sympathetic or ganglionic; the one fairly well, the other indifferently understood. It is the function of the one to preside over animal life, the other is supposed in some way to preside over organic life. It is through the nervous apparatus of the pelvis that we are able many times to learn the location and extent of a disease. In discussing the spinal and vaso-motor nerve supply to the pelvis, I may say that the sacral plexuses, which are exceedingly large, extensively supply (in a general way) all the organs in this region, and owing to their peculiar arrangement any irri- only to preserve the equilibrium of the muscles of these parts so intimately associated, but also to manifest the existence of irritacera.

The function of the somatic nerves is not tation to one organ affects the adjacent vistion through the sense of pain. The sympathetic nervous system forms by far the larger part of the nervous plexuses, connected with the viscera of the pelvis, and is in perfect accord with the cerebro-spinal nerves; thus the universal law of harmony in the works of nature is beautifully illustrated here. This vast pelvic plexus, with its many vagrant ganglia, forming the gangliated cord, macroscopic and microscopic, is indirectly connected with the spinal cord by distinct threadlike nerve filaments, which are insignificant in appearance and are situated upon the anterior aspect of the sacrum. These, together with a chain of connecting links uniting them with other parts of this system of nerves by means of inter-ganglionic cords and other filaments, make up a well constructed system.

The sympathetic sacral-plexus consists of five ganglia, located in front of the anterior sacral foramina on both sides, ten in all. These ganglia are connected with the cerebrospinal nerves by two small filaments on the proximal side, and on the distal side there are numbers of filaments spreading out into the pelvic plexus, while the ganglia on each side are united by the inter-ganglionic cords. In these plexuses we have ganglia much smaller, microscopic in size, and are found in the uterus in larger numbers than anywhere else in the pelvis.

To give a more clear description of the sympathetic system I may state that it consists of a series of ganglia communicating with those of the cranium, namely, submaxillary, otic, Meckel's, ophthalmic and Gasserian, and below the cranium we have the cervical, dorsal, lumbar and sacral all connected together by intervening cords extending to the coccyx below on both sides of the middle line of the body. Connected with these ganglia internally are three ganglonated plexuses, which are aggregations of nerves and ganglia, namely, thoracic, abdominal and pelvic. There are also smaller ganglia situated in important viscera, as in the uterus, etc. In addition to these we find numerous nerve fibers of two kinds, communicating and distributory. The communicating nerve fibers connect the ganglia on one side of the median line with those on the opposite side, also the ganglia on the same side with each other, thus forming a chain, and, lastly, the communicating fibers that unite the ganglia with the cerebro-spinal nerves. These connect with both anterior and posterior divisions of the spinal nerves. It may therefore be observed that this nervous system has three roots, and consequently three functions—motor, sensory and sympathetic. What greater and more important function has the brain? Although it is but problematical that the ganglia of the sympathetic nervous system possess intelligence, I have for years harbored the belief that it is true nevertheless.

Viewing the clinical side of the picture of the ganglionic nervous system, we find it overcast with clouds of uncertainty, but summoning to our aid the fact that we have here an immense system of ganglia and aggregated plexuses connected with viscera, surrounding the arteries and all barely united to the cerebro-spinal nerves, we are forced to believe, as a logical conclusion, that its function must be manifold. Disturbances of the pelvic ganglionic chain, either pathologically or mechanically, produces unmistakable symptoms through what is termed reflexes or nerve impulses that may be felt in the stomach, back, heart, lungs or head. It has occurred to me that constipation is also due, in a great measure, to vaso-motor disturbance. Fainting or pallor or cold perspiration from some exciting cause is due to the vaso-constrictors, while blushing is caused by the action of the vaso-dilators. All of these symptoms I believe to be wholly dependent upon the sympathetic system and independent of the brain. While I can furnish no positive proof of the assertion, circumstantial evidence, to my mind, is almost conclusive. The local effect of vaso-motor disturbance in the pelvic organs is either to starve or congest them. Joy, fear, etc., are often felt in one or more of the pelvic organs—the rectal or vesical plexuses for example.

One of the most perplexing conditions of the pelvic brain is to ascertain through it what viscera among the number are responsible for the apparent morbid condition. How frequently have we seen ovaries and tubes removed (and they are usually the first to be sacrificed) for supposed disease, and no relief

from the symptoms follow. Next the uterus will doubtless be removed without cessation of symptoms. In fact I have seen a fourth laparotomy resorted to with the vain hope that a ligature or some other foreign substance was the cause of the suffering in the region of the pelvis. It is highly probable that in this case the disease was in the nervous system.

In conclusion I desire to state (dogmatically, however, as I cannot prove it) that many of the depleting diseases, such as leukæmia, leucocythæmia, pernicious anæmia and Addison's disease so-called, a supposed disease of the supra-renal capsule, are diseases of the sympathetic nervous system, due to trophic or vegetative disturbance in the vagrant ganglia that are endowed with distinct trophic centers independent of the brain or cord.

This is no new theory with me; I have long entertained these views from clinical experience with the so-called leucocythemia and Addison's disease, with or without discoloration, and diseases of this character.

DISCUSSION.

Dr. Milton Jay of Chicago: This is too valuable a paper to be passed without some discussion. While we may have to do more with some other class of injuries than diseases of the female pelvic organs, yet we are constantly coming in contact with troubles involving the pelvis. It is a well-known fact to every surgeon who has had little or much to do with the kind of practice mentioned in the paper, that the ovaries, tubes, or the uterus itself, has been removed for the relief of supposed pathological conditions without the least particle of benefit. There is, as the essayist says, a peculiar anatomical structure of the arteries, veins and lymphatics in certain individuals, and I believe the lymphatic system is less understood to-day by the average practitioner than the circulatory system of either arteries or veins.

In conditions of this kind we can readily see from the description given how the pelvic viscera may become engorged, and the surgeon has to do something, and laparotomy is fashionable. We know in congested conditions of the female pelvic organs that when the patient is placed upon her back, the hips elevated, and a certain amount of massage and hot water douches are used, the tendency is to equalize the circulation and to relieve the engorged condition of the pelvic viscera, and many of these cases can be materially benefited without resorting to the knife. It seems to me the paper teaches us an important lesson and we ought to take heed.

PRACTICAL RELATIONS OF STATE HEALTH AUTHORITIES WITH RAILWAYS AND OTHER PUBLIC CARRIERS IN THE MATTER OF THE TRANSPORTATION OF CORPSES.*

By P. H. Bryce M. A., M D., of Ontario.
Secretary of the Provincial Board of Health.

In dealing with the subject upon which I have been asked to prepare a paper, it is necessary that we recognize several conditions which, during the past twenty-five years, have changed. In the matter of the transportation of the dead, and which effect very materially the relations of public health authorities in this matter. The first of these is the enormous development in the facilities to transmit freight and express parcels of all kinds by rail, both as regards time and expense. 2d. The well-determined cause of the origin of the principal contagious diseases and of their methods of dissemination, and, third, the development along with such knowledge of the scientific means whereby the infectiousness of such diseases may be wholly or in a greater part limited.

Formerly the limited amount of travel between different sections of the country, the time and expense involved therein, necessarily made the number of persons dying away from home less than at the present time, and the question of their transportation home, owing to the several reasons, was a matter which would only occasionally be discussed. To illustrate how common the transportation of the dead has become at the present time, I subjoin the returns supplied me by the kindness of Mr. Quick, the General Freight Agent of the Grand Trunk Railway: Corpses shipped per G. T. R., May (1898), 151; June, 95.

With such everyday facts before us, it is evident that the social sentiment of our American communities tends to conform with

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abroad should be buried at home. As regards the transportation of contagious diseases, which necessarily becomes a question with which health authorities everywhere have to deal, it is apparent that the facts known for so long a time that contagion spreads from such bodies, necessitated the absolute prohibition of their transportation as the only means formerly known whereby public interests in matters of health could be considered. This may be said to be simply an illustration of what formerly was known as a "shotgun" quarantine in dealing with outbreaks of smallpox, cholera and other similar contagious diseases. To-day, however, it may be said that in all states and provinces where state medicine has become developed, these old methods have largely given way to a more intelligent and effective scientific quarantine, so in the matter of the transportation of the dead, we now must recognize the ready limitation of the spread of such diseases by the use of simple, yet thoroughly scientific, measures, and the only question which would seem to remain for our consideration, whether as state officers, municipal officers or railway the old idea, that members of families dying surgeons, is, What practical organization is available for putting such methods into effect?

There are three factors necessary for the solution of this problem: state and municipal regulations with such authority and machinery for their proper execution; railways willing and prepared to carry out their share of the work, and the undertaker or person representing the individual of the community whose duty and desire it is to see that his dead is buried, both in conformity with his wishes and the regulations of the state. In practice it may be said that no machinery, theoretically performed in regard to dealing with contagious disease, has always proved equal to the work to be done. To-day in several states, possibly in one or two states, the undertaker or embalmer is licensed, and by such license is assumed to be trained in all modern scientific methods for preparing dead bodies for transportation without danger to the public, and to be of such long standing in the community that the community may in this particular trust its health to his care. For instance, the city of Chicago has licensed embalmers, divided, I believe, into grades, and upon these individuals the Health Department rests along with the physician who has attended a patient who has died, for the safe carrying out of regulations for the safe transportation of contagious disease.

The following two communications illustrate what may happen occasionally, though perhaps not frequently, as a result of dependence on such persons.

1st. A letter of Dr. Sheard's regarding scarlatina brought from Chicago:

Toronto, April 12, 1898.

Dr. Peter H. Bryce, Secy. Prov'l Board of Health.

Dear Doctor:—We have had a case of scarlet fever reported from No. 53 Borden street in the family of one Crompton. My inspector, on looking into the matter, informs me that Alice D. Crompton, three years of age, came from Chicago on April 7 and on April 9 was taken with scarlet fever and removed to the Isolation Hospital.

On March 24 Guy and Marion Crompton were down with scarlet fever in Chicago and attended by one Dr. Porter. Guy Crompton died on April 5 and a certificate was given by Dr. Porter of "heart failure." The body was brought on from Chicago and interred in Toronto on the 7th of April. Marion Crompton is at present in Chicago and ill with scarlet fever. The inspector was informed by the Crompton's that Dr. Porter gave them permission to come to Toronto.

In view of the trouble which we had with scarlet fever in the city of Toronto last summer and the extreme liability to the spread of the infection, I think these facts ought to be presented to the Health Commissioner of Chicago, and with that object in view take the liberty of writing you in reference thereto.

Faithfuly yours (Signed), Charles Sheard, M. D., Medical Health Officer.

2d. Dr. Bryce's letter to Dr. Reynolds, Health Office of Chicago:

Toronto, April 13, 1898.

Dr. A. R. Reynolds, Commissioner of Health, Chicago, Ill.

Dear Doctor:—I send you a copy of a letter I have received from Dr. Sheard, Medical Health Officer of Toronto, regarding the appearance of scarlet fever in a family reported as recently having come from Chicago. The cause of the transportation is apparent in the

report of the physician, which gives "heart failure" as the cause of death. I shall be greatly obliged if you will have the facts inquired into as to whether the child, Guy Crompton, who died April 5, had been reported to your department as a case of scarlet fever. As you are aware, a representative of the State Board of Illinois attended the conference at Cleveland last June where we were discussing the transportation of corpses by rail, and while the general feeling was that we wished to encourage transportation under proper supervision, it is clear that we must have such dependence on our undertakers that they will not be guilty of such violations of the law as that reported by Dr. Sheard.

Your obedient servant, (Signed), Peter H. Bryce, Secy. Provincial Board of Health.

3d. Dr. Reynolds' reply:

Chicago, April 18, 1898.

P. H. Bryce, M. D., Secy. Provincial Board of Health, Toronto, Ont.

Dear Doctor:—Your letter of the 13th inst., with an inclosure from Dr. Sheard with reference to the fact that Alice D. Crompton, three years of age, was taken with scarlet fever on her arrival at Toronto from this city, and the fact that the body of Guy Crompton was shipped to Toronto with a shipping permit showing the cause of death to be "heart failure," when in fact it was scarlet fever, is received.

Inclosed you will find copy of the death certificate filed in this office, which shows that the death was from scarlet fever, heart failure a contributing cause. You will also find a copy of the report of Dr. Gunn, Inspector of Funerals, and a report from James J. Dillon, the Recorder of Deaths. From these reports it is evident that the body was properly prepared and the cause of death given was scarlet fever and not heart failure. We must, of course, admit that Alice Crompton should not have been allowed to travel from a home where scarlet fever existed. I have not yet heard the full particulars from Dr. Porter, but an investigation is in progress and he will be dealt with if we find he sanctioned the trip.

It is our custom to permit the attending physician, where he assumes to prevent the spread of a contagious disease, to have charge of the case. As a rule it works admirably. At present, however, its looks as though Dr. Porter had rather betrayed the confidence reposed in him.

Very truly yours (Signed), Arthur R. Reynolds, M. D., Commissioner of Health.

4th. Dr. Bryce's reply to Dr. Reynold's letter:

Toronto, May 3, 1898.

Dr. Arthur R. Reynolds, Com. of Health, Department of Health, Chicago, Ill.

Dear Doctor:—I have to thank you very much for your letter of the 18th ult. regarding this matter. I have sent Dr. Sheard a copy of your letter and trust that the matter is satisfactorily explained.

Yours very truly (Signed), Peter H. Bryce, Secretary.

It will be quite apparent from this illustration that health authorities, in granting that modern methods for the transportation of persons dead from infectious disease is sufficient to protect the public health, are assuming that the persons who in municipalities may be permitted to do this work for the preparation of the dead are competent and must recognize that local conditions are much too varied for absolute trust in the thoroughness of the knowledge and work of undertakers taken as a class. Notwithstanding this fact, the public health authorities of different states and provinces on the continent have, by reports, adopted as a successful method, and recognized that the resolutions, which are the outgrowth of the conference held in Cleveland in June, 1897, between state officers of health, railway authorities and representatives of the Undertakers' Association, are, if properly carried out, adequate, in their judgment, for the protection of the public health and for confirming the deep-seated social sentiment already alluded to. For the convenience of members of the association who may not have seen these regulations, I include them herewith. I may say that these regulations have, so far as Ontario is concerned, been approved of by the Provincial Board of Health, and only await the approval of the governor and his executive before they can become law.

In the report of the Provincial Board of Health, which adopts these regulations, there is, however, a very definite line of action

deemed necessary for their proper execution. The report states:

(a) With a view to giving effect to these regulations, your committee has attempted to give practical expression to the views of your board as expressed at the last meeting. In order to insure proper care and preparation of the bodies of the dead, prior to transportation, is it proposed that for the purposes of these regulations, the seventeen divisions into which the Province of Ontario is divided, for returning representatives to the Ontario Medical Council, be adopted, as the units for which one or more certified persons may be appointed to carry out the foregoing regulations of the Provincial Board.

(b) In order that persons certified may be fully qualified to carry out the regulations, your committee would suggest that examiners nominated by your board be appointed, before whom candidates shall be notified to appear from the several divisions, and that in accordance with their standing on examination, they shall receive a certificate of qualification.

(c) In order that the greatest control may be practiced in cases of dead bodies prepared for transportation, it is recommended that there is but one person named in each of the seventeen districts, who would be a resident in the district.

(d) In order that the matter may be properly regulated as regards expense, the board would prepare a schedule, in which would be included the cost of the traveling expenses and of the preparation of the body for transportation; while at the same time a provision would be inserted in the regulations governing the appointment, whereby a disputed account could be taxed in the matter of costs.

(e) It would further be necessary to provide that a certified appointee could engage in work beyond his own electorial division only at the request of the appointee for such latter district, or in the case of the sickness or death of any appointee or in other emergency; the power to allow the passing from one district to another might rest with the secretary of this board. The latter methods to be added by me further with regard to the subject I present to you for discussion.

To-day, practically no bodies dead of contagious disease are transported by the railways of either the United States or Canada, and it must be apparent to the members of this association that, where some sixty states and provinces have a common railway system, where thousands of municipalities, with their officials, exist in these different states and provinces, and where hundreds of railways exist under different managements, that the state officer, if he admits the practical possibility of transporting persons dead of contagious disease without endangering the public health within his jurisdiction, has to feel that there is binding him a common organization, which is prepared to protect his public against the many possible accidents which such diverse communities and interests involve. It appears to the members of this association that it is the practical time when such an association of trained scientific gentlemen upon whom such a state officer can confide, viz., the International Association of Railway Surgeons, while it may be said their interests are those of the companies they represent, and it might be that such gentlemen might at times fail to conform with regulations which might be detrimental to the temporary interests of their company, I recognize that, on the other hand, by virtue of the scientific status of the members of this association, they will require state officers to recognize that the best interests of the railways are consulted by the closest conformation with a system of regulations which, however managed, ought certainly to be uniform in practice.

What can the members of this association do to assist public health officers in this matter? I would say, by advancing in those communities and states from which they come their most earnest efforts for the appointment of a number of expert and scientific members of the medical profession, who shall be responsible to the state authorities, for overseeing the preparation in every case of the bodies of those dead of contagious disease within their jurisdiction for transportation, both within and beyond state boundaries. There need not be many such, since it has been estimated that out of 1,000 deaths in Ontario, dead of contagious disease, probably not more than 50 would die away from home. If such officers could be called for by the undertakers in charge of the arrangements for a funeral, they would proceed to such point within their juris-

diction, supervise the preparation for transportation and forward, as is provided in the regulations, a copy of the transit permit made in duplicate, to the central health officer of the state. By this simple method it appears that such regular control of the transportation of the dead over the whole continent becomes possible, as it will make it a simple matter to trace any unfortunate results growing out of any particular case immediately back to the responsible party.

I trust that this association will give to this subject not only such discussion as its importance deserves, but will, by resolution and in such other way as it can, in bringing into practical effect a work in which the companies they represent are so greatly interested, from the financial standpoint in the community they live in, and still more greatly interested from the public health standpoint.

REGULATIONS OF THE PROVINCIAL BOARD OF HEALTH OF ONTARIO FOR THE TRANSPORTATION OF THE DEAD (SUBJECT TO APPROVAL).

Rule 1.—The transportation of bodies dead of smallpox, Asiatic cholera, yellow fever, typhus fever or bubonic plague, is absolutely forbidden.

Rule 2.—The bodies of those who have died of diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), glanders, anthrax, or leprosy, shall not be accepted for transportation unless prepared for shipment by being thoroughly disinfected by (a) arterial and cavity injection with an approved disinfectant fluid, (b) disinfecting and stopping of all orifices with absorbent cotton, and (c) washing the body with the disinfectant, all of which must be done by persons approved of by the Provincial Board of Health. After being disinfected as above, such a body shall be enveloped in a layer of cotton not less than one inch thick, completely wrapped in a sheet and bandaged and encased in an air-tight zinc, tin, copper or lead-lined coffin, or iron casket, all joints and seams hermetically soldered, and all enclosed in a strong tight wooden box. Or, the body being prepared for shipment by disinfecting and wrapping as above, may be placed in a strong coffin or casket, and said coffin or casket encased in an air-tight zinc, copper or tin case, all joints and seams hermetically soldered and all enclosed in a strong outside wooden box.

Rule 3.—The bodies of those dead of typhoid fever, puerperal fever, erysipelas, tuberculosis and measles, or other dangerous and communicable diseases, other than those specified in Rules 1 and 2 may be received for transportation when prepared for shipment by filling cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton, and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a sheet and bandaged and encased in an air-tight coffin or casket, provided, that this shall apply only to bodies which can reach their destination within forty-eight hours from time of death. In all other cases such bodies shall be prepared for transportation in conformity with Rule 2. But when the body has been prepared for shipment by being thoroughly disinfected by a person approved by the Provincial Board of Health as in Rule 2, the air-tight sealing may be dispensed with.

Rule 4.—The bodies of those dead of diseases that are not contagious, infectious or communicable, may be received for transportation when encased in a sound coffin or casket and enclosed in a strong outside wooden box; provided they reach their destination within thirty hours from time of death. If the body cannot reach its destination within thirty hours from time of death, it must be prepared for shipment by filling cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a sheet and bandaged, and encased in an air-tight coffin or casket. But when the body has been prepared for shipment by being thoroughly disinfected by a person approved of by the Provincial Board of Health, the air-tight sealing may be dispensed with.

Rule 5.—In cases of contagious, infectious or communicable diseases, the body must not be accompanied by persons or articles which have been exposed to the infection of the disease, unless certified by the proper officer as having been properly disinfected; and before selling passage tickets agents shall carefully examine the transit permit and note the name of the passenger in charge, and of any others proposing to accompany the body, and see that all necessary precautions have been taken to prevent the spread of disease. The transit permit in such cases shall specifically state who is authorized by the health authorities to accompany the remains. In all cases where bodies are forwarded under Rule No. 2, notice must be sent by telegraph to health officer at destination, advising the date and train by which the body may be expected. This notice must be sent by or in the name of the health officer at the initial point, and is to enable the health officer at destination to take all necessary precautions at that point.

Rule 6.—Every dead body must be accompanied by a person in charge, who must be provided with a passage ticket and also present a

full first-class ticket marked "Corpse" for the transportation of the body, and a transit permit properly signed by the Division Registrar, as provided by the Registration Act, also undertaker's certificate, name of deceased, date and hour of death, age, place of death, cause of death, and if of a contagious, infectious, or communicable nature, the point to which the body is to be shipped, and when death is caused by any of the diseases specified in Rule No. 2, the names of those authorized by the health authorities to accompany the body. The transit permit must be made in duplicate, and the signature of the proper official must be on both the original and duplicate copies. The undertaker's certificate and paster of the original shall be detached from the transit permit and pasted on the coffin box. The transit permit shall be handed to the passenger in charge of the corpse. The whole duplicate copy shall be sent to the official in charge of the baggage department of the initial line, and by him to the secretary of the Provincial Board of Health of Ontario.

Rule 7.—When dead bodies are shipped by express the whole original transit permit shall be pasted upon the outside box and the duplicate forwarded by the express agent to the secretary of the Provincial Board of Health of Ontario.

Rule 8.—Every disinterred body, dead from any disease or cause, shall be treated as infectious or dangerous to the public health and shall not be accepted for transportation unless said removal has been approved by the provincial health authorities having jurisdiction where such body is disinterred, and the consent of the health authorities of the locality to which the corpse is consigned has first been obtained; all such disinterred remains shall be inclosed in a hermetically sealed (soldered) zinc, tin or copper lined coffin or box. Bodies deposited in receiving vaults shall be treated and considered the same as buried bodies.

SUPRAPUBIC LITHOTOMY FOR STONE IN THE BLADDER WEIGHING 1,391 GRAINS—RECOVERY.

By William Davis Foster, M. D., of Kansas City, Mo.,

Chief Surgeon K. C. O. & S. Railway.

PATIENT'S HISTORY.

History of James A. McD——, aged 26, born in Knoxville, Tenn:

"Have suffered since a boy about 7 years of age with pain at the neck of the bladder. I often desired to urinate with sudden starting and stopping; at times would always pass water on rubbing where the channel led upward; at times would take me five or ten minutes to urinate. Could not stand to be jolted; would hurt if starting to run or to move after remaining still; would wet the bed every night till the age of 15; could hold my water from two to three hours at a time. When, getting a shakeup of any kind, or any excitement, would cause the pain to start; only relief would be to urinate; after desire to urinate would be in misery till I could go and urinate. These are the symptoms till about 15 years of age; changed a little then. Quit wetting the bed; would wake up from two to six times a night. I then noticed white flakes passing with urine; at times a little blood mixed in it. That

Fig 1.

has continued up till the present time; sometimes would not pass any for a few days; could feel it accumulate at the neck, and give lots of pain till I would begin to pass it off. The last four months I have been suffering, and seem to be going down all the time. My water seemed to be darker and thicker, lots of mucus and pus, little flakes of black-looking blood; there would be quite a sediment left in the chamber; and there has been a sediment for about fifteen years. In the last two years I have been growing worse; would strain to urinate, pass about one drop, then I would want to have a passage of the bowels also. My bowels were generally loose and soft, never hard.

"I have taken a great deal of medicine in the last two years. Last spring had my bladder washed out about twelve times, which helped me considerable for five or six months; then grew worse than ever. Always taking several

kinds of medicine, but could get no relief till I had the operation performed.

"I was sounded twice for 'gravel' when I was about 17 years old, could not find anything; then I let it go until the winter of 1896-7. In New Orleans when the first straining spell came on, I went to the doctor there; he sounded me, and said I had a stricture at the

Fig. 2

neck of the bladder, gave me some medicine that stopped the straining; in Kansas City I went under treatment with a doctor, who examined by urine, and said I had catarrh of the bladder. He washed out my bladder once a week for about twelve times; then I went to Dr. P. F. Peet and was under him till the operation. He washed my bladder out several times, till I could stand it no more.

CLINICAL NOTE.

The history recited by the patient shows, in a very clear manner, the symptoms of stone in the bladder, beginning at an early age. At the time of the operation the patient was unable to retain his urine for more than from fifteen to thirty minutes. This shows that the entire cavity of the bladder was occupied by the stone. The case was remarkable in several ways. The following chemical analysis will show the character of the calculus:

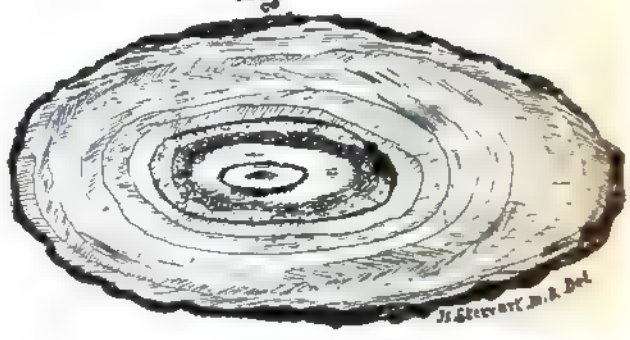
Kansas City, Mo., Sept. 26, 1898.

Wm. Davis Foster, M. D., "Dear doctor:—The center nucleus consisted of mucus threads, the principal part of the stone is uric acid. The external coating is phosphate and carbonate of lime. The distinct crystalline rings are pure uric acid. Respectfully, EDWIN R. HEATH, M. D."

The operation of suprapubic cystotomy was performed at All Saints' Hospital, on April 12, 1898, in the presence of Doctors Dean, Cramer, Peet, Rosenwald, Adams, and the hospital staff. The operation was made as follows:

The patient being fully under the anæsthetic, the rectum was distended with the colpeurynter, containing about twelve ounces of warm water. The bladder was injected with four ounces of hot boric acid solution; a sonde à dart was inserted. An incision was made in the median line down to the bladder. The stylet of the sonde was then forced through the bladder, the walls were taken up on the two sides by hæmostats, and the wound enlarged with the bistoury. It was found, then, on further examination, that the stone was so large that it became necessary to extend the incision in the bladder down to the neck and up into the fundus so far that, unfortunately, the peritoneum was opened. Even after this extensive incision was made, it was still difficult to remove the stone. This was, however, accomplished by the exercise of patient manipulation. The stone weighed thirteen hundred and ninety-one grains. The patient rallied well from the operation and made a very uneventful recovery. Without going into particularity of detail, I glean from the bedside notes that the highest temperature reached was on the third day, when it was 101 2-5°. The pulse went up to 120. Soon after, however, the symptoms of peritonitis subsided, and, on about

Fig. 3



the tenth day after the operation, the patient's temperature and pulse were normal, and so continued during convaleseence. The urine at first escaped entirely through the abdominal wound; this gradually subsided. On June 1, the external wound was entirely healed and the patient's urine escaped through the natural passage.

Waiving a critical examination of the different operations for stone, it may be sufficient

to say that in this case the suprapubic method was particularly applicable. Any attempt to have removed this stone by the classical or perineal method would have resulted in disaster; any attempt to remove this stone by the crushing process would have, undoubtedly, also been disastrous. In consequence of its hardness and great size, it would have been impossible to grasp the stone in the lithotrite and crush it.

There is no doubt but that each operation for stone has its own peculiar advantages. When the stone is small and soft and easily crushed, it may be removed, either by the perineal operation or by crushing, but it is now certain that in case of a large and very hard calculus, especially in young persons, the suprapubic operation has many and very characteristic advantages.

SUPRAPUBIC LITHOTOMY.

From a brief look into the remote history of suprapubic lithotomy, one is surprised to observe the many vicissitudes through which it has passed; sometimes standing high in the estimation of the profession, at other periods sinking entirely into oblivion. The history, however, is full of interest to those desiring to investigate the subject, for here and there throughout its literature, exhaustive monographs appear; exhibiting the zeal and perseverance of those who from time to time have been the upholders of the operation.

In the whole history of hypogastric lithotomy, the most decidedly unique case in all its details is that of Jean de Dot, the smith, of Amsterdam, "who cut himself in the linea alba above the pubis, and took out of his bladder a stone as large as a hen's egg. The stone, the knife, and the portrait of the operator may be seen to this day in the Museum of Leyden.

"Being anxious while investigating this subject to learn more of this remarkable case, I addressed a communication to Mr. Holden, inquiring if more details could be furnished. I received, in a courteous reply, the following extract: 'Jean de Dot, a smith of Amsterdam, cut a stone as big as a goose egg out of his own bladder by the suprapubic operation; he used a pocketknife previously sharpened, and was assisted by his apprentices.

" 'This case happened in the seventeenth century, and the history is attested by the burgomeister and town council, as also by the College of Surgeons.'

On a late visit to Holland I took especial pains to visit the Anatomical Museum at Leyden, and had the satisfaction of seeing the stone, the knife (which is an ordinary shoemaker's knife, not a pocketknife, as related by Hyrtl), and the certificate of the notary, 'Pier de Barry,' with the date of Maye, 1651.' I observed also that the record reads Jean Doot, and not 'de Dot' as is printed in several works of to-day. HELMUTH."

The drawings, artistic and accurate, from which the cuts were made, are furnished by my friend, Dr. J. C. Stewart, of this city.

The Disinfection of Street Cars.

According to the Medical Review, a resolution offered by Dr. C. H. Hughes, at a meeting of the St. Louis Board of Health, on November 11, with regard to the sanitary inspection of street cars and sleeping cars, was adopted. It is similar to the resolution offered before the board more than a year ago, but more sweeping in its provisions. The resolution requests the city authorities to enact such legislation as will compel the companies to keep their cars in proper sanitary condition. It specifies that the cars should be inspected by the city authorities; that an appropriation be made for the work; that the cars shall be disinfected with fresh air, antiseptics and ozonization after each trip in which they are crowded with passengers. The resolution also suggests that the cars be placarded when the seats are filled, in order to prevent the crowding of passengers.

To Remove Nitrate of Silver Stains.

A few days ago my nurse showed me some new towels ruined, as she put it, by silver nitrate stains. Standing before me was a mixture (iodine 2 grains, potass iodid 10 grains, glycerine oz.i) which I used often on vaginal tampons, and it occurred to me to try it upon the stains. In a very few moments the black color gave place completely to the yellowish color of the mixture, and this washed out readily. It goes without saying that starch if present should first be washed out. The inquiring mind can easily satisfy itself by experiment whether all these ingredients are necessary or not.—Pac. Record Med. and Surg.

In wounds of the abdomen, always remember the part played by concussion of the solar plexus, which may be so great as to lead to the mistaken belief that very serious visceral injury has taken place.—I. J. Surg.

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THE TRANSPORTATION OF DEAD BODIES.

In another column of the present issue we print the paper of Dr. Bryce on this topic, which was read by title at the Toronto meeting. The subject is especially important and vexatious to health authorities, and uniform rules, to be in force on the whole continent, would be a great step forward. Owing to the disastrous results to trainmen or their families following the shipment of bodies dead from diphtheria or other communicable diseases, a joint conference of representatives of state and provincial boards of health, funeral directors and general baggage agents was held at Cleveland on June 9, 1897. At this gathering rules were formulated for presentation to and were adopted by the National Conference of State Boards of Health at Nashville, August 19, and the Association of General Baggage Agents, at Denver, October 13. On these rules were founded the regulations for the state of Illinois, and for convenience we reprint the latter, as well as those of several other states having similar rules and regulations.

For a few years past the Chicago Health Department (which was the first to undertake this innovation) has examined and licensed embalmers and arranged them in two divisions —Class A, who are given full sway in the matter of preparing bodies for burial and shipment, and Class B. The members of the latter class are not allowed to prepare bodies dead from contagious diseases unless a funeral inspector from the department is present. This plan has worked very satisfactorily so far. As regards the case alluded to by Dr. Bryce, we fail to see that it is any argument against the practice or that it is even relevant to the topic at issue.

After reading the testimony it is every evident that infection was carried not by the corpse, but by the living child. For years back the Chicago Health Department has refused to accept "Heart Failure" as the chief cause of death. By its system it is not necessary to smuggle a contagious or infectious disease through under the names of heart failure, pneumonia, etc. The department believes a body dead from contagious or infectious disease can be made safe, but that everyone coming in contact with the body should have the advantage of knowing the disease they are handling. For instance, if a baggageman is handling a body of a person dead from scarlatina he will naturally be more careful than if the cause is written heart failure.

Concerning the proposed examiners or funeral inspectors, or whatever they may be called, it is not at all probable that they will be of any higher grade if selected by the state than if chosen by municipalities, for owing to the curse of politics in this country, they will come from the same source in both instances. Again, it is far more likely that competent examiners will be found in the large centers of population than in country districts.

To Remove the Odor of Iodoform from the Hands.

For this purpose Bionert recommends washing the hands once or twice with flaxseed meal in water. He states that the odor very quickly disappears.—Deutsche Med. Zeitung.

Medico-Legal Notes.

An old Pennsylvania law has been singularly revived in Pittsburg. Fifteen years ago Frank Leslie Gould had a leg cut off by a car of the South Side Passenger Railway Company. He was then only 5 years old, but attained his majority recently, and now brings suit under an act of assembly approved March 27, 1713, which permits a minor to bring an action for damages within six years after he becomes 21 years old, in his own right, and without reference to the time when the cause for the action may have occurred. As late as 1881 the Supreme Court of Pennsylvania decided a case in which the act was declared to be good law. Young Gould claims $25,000 damages for the loss of his leg.

Carriers.—Unprovoked use by conductor to passenger of abusive language, tending to humiliate passenger, gives the latter a right of action against the railroad. Cole vs. Atlanta & W. P. R. Co. (Ga.) 31 S. E. 107. A passenger cannot recover for personal injuries caused by jumping from moving train when unnecessary, and when he was told by defendant's agent not to do so. Western & A. R. Co. vs. Goodwin (Ga.) 31 S. E. 157.

Damages.—A verdict for $5,500 for injuries to a boy, resulting in the amputation of his arm and leg, is not excessive. Louisville & N. R. Co. vs. Chism (Ky.) 47 S. W. 251: Measure of damages for injury to child is the difference between what he will earn after reaching his majority and what he would have earned but for such injury. South Covington & C. St. Ry. Co. vs. Herrklotz (Ky.) 47 S. W. 265.

Master and Servant.—Complaint in action by servant against master for injuries caused by use of a defective tool need not aver that plaintiff carefully examined it before using it. Boyce vs. Schroeder (Ind. App.) 51 N. E. 376: A railroad company held not liable for injury to a brakeman received while coupling the car of another railroad to its train, on account of the drawbar being different in height. Ellsbury vs. New York, N. H. & H. R. Co. (Mass.) 51 N. E. 415. A foreman directing putting in car scales held not fellow servant of carpenter working under him. Kansas City Car & Foundry Co. vs. Sechrist (Kan. Sup.) 54 Pac. 688. A master's failure to promise that he would supply a new appliance is not obviated by the servant's belief that such new appliance would be supplied when he was injured by defects in the old one. Purcell Mill & Elevator Co. vs. Kirkland (Ind. T.) 47 S. W. 311. An employer held guilty of negligence in not testing a wire rope after he was informed by the employe that it was rusty. Purcell Mill & Elevator Co. vs. Kirkland, supra. An employe injured by the breaking of a wire rope which he had found to be a little rusty held not guilty of contributory negligence. Purcell Mill & Elevator Co. vs. Kirkland, supra. Where a plank forming a suspended walkway was unfastened and fell on an employe, held that it was for the jury to say whether he could recover. Quimby vs. Boston & M. R. R. (N. H.) 41 Atl. 266. An averment that defendant negligently permitted a certain appliance to become defective, and so remain, implies knowledge or ignorance of the defect. Chicago, B. & Q. R. Co. vs. Kellogg (Neb.) 76 N. W. 462. A petition charging actionable negligence must allege that employe, without fault, was injured because of a specific negligent act of the master. Chicago, B. & R. R. Co. vs. Kellogg, supra. In action for injury by defective appliance, an instruction that defendant must use reasonable care, in keeping appliance reasonably safe, does not lay burden of proof on defendant. Chicago, B. & Q. R. Co. vs. Kellogg, supra. To entitle servant to verdict because of injuries from defective appliances, he must show that the master knew or was inexcusably ignorant of the defect. Chicago, B. & Q. R. Co. vs. Kellogg, supra. Where servant sues because of injuries from defective appliance, the fact that the accident happened is no evidence of negligence. Chicago, B. & Q. R. Co. vs. Kellogg, supra. A servant put to other work than that for which he was employed does not assume additional risks incident thereto, which are not known to him. Brown vs. Ann Arbor R. Co. (Mich.) 76 N. W. 407.

Negligence.—A child less than four years old cannot be guilty of contributory negligence. South Covington & C. St. Ry. Co. vs. Herrklotz (Ky.) 47 S. W. 265. The negligence of the parent cannot be imputed to the child who is too young to be guilty of contributory negligence. South Covington & C. St. Ry. Co. vs. Herrklotz, supra.

Railroads.—Though traveler at railroad crossing does not exercise care, he can recover if, after discovering that the statutory signals are not given, he used due diligence to escape the consequence of the railroad company's negligence. Comer vs. Barfield (Ga.) 31 S. E. 89. Ordinance limiting speed of railroad trains within a city to six miles an hour held not unconstitutional. Erb vs. Morasch (Kan. App.) 54 Pac. 323. Where a person on a track in a city not at any crossing is injured by a train running at forbidden speed, it was negligence of which the person injured could complain. Erb vs. Morasch, supra.—Chicago Law Jour.

Extracts and Abstracts.

Transportation of Dead Bodies—Circular Letter Addressed to State Health Officers.

Washington, D. C., August 24, 1898.

Sir:—I have to respectfully request that you will furnish this bureau with a copy of the laws and regulations governing the admission to and transit through your state of bodies of persons dying of contagious disease or otherwise.

An early reply is desired for the reason that many inquiries are made of this bureau from friends of soldiers who die in Cuba and Porto Rico, who wish the bodies returned to the United States.

WALTER WYMAN, Sur.-Gen., M. H. S.

ARKANSAS.

No body of any person dying of contagious disease is permitted shipment into or through the state except in very cold weather, and then it must be accompanied by a certificate that it has been thoroughly disinfected and the coffin hermetically sealed and encased in a close box. Under these conditions a permit will be issued, provided there be no delay in transit.

CONNECTICUT.

According to section 113 of the general statutes, a dead body is allowed transportation from or into the limits of any town in the state, provided there be attached to the coffin or case containing such body a written or printed permit certifying the cause of death or disease of which such person died and the town in which such person is to be buried, and further certifying, in case said disease is shown on the permit to have been cholera, yellow fever, membranous croup, diphtheria, typhus fever, enteric fever, scarlet fever, measles, leprosy, smallpox or other pestilential disease, that the body is inclosed in an air-tight coffin or case hermetically sealed and that it has been disinfected in accordance with the method prescribed from time to time by the state board of health.

ILLINOIS.

Rule 1. The transportation of bodies dead of smallpox, Asiatic cholera, yellow fever, typhus fever or bubonic plague, is absolutely forbidden.

Rule 2. The bodies of those who have died of diphtheria (membranous croup), scarlet fever, glanders, anthrax or leprosy shall not be accepted for transportation unless prepared for shipment by being thoroughly disinfected by (a) arterial and cavity injection with an approved disinfectant fluid, (b) disinfecting and stopping of all orifices with absorbent cotton, and (c) washing the body with the disinfectant, all of which must be done by an embalmer, holding a certificate as such approved by the state board of health or other state health authority. After being disinfected as above the body shall be enveloped in a layer of cotton not less than one inch thick, completely wrapped in a sheet and bandaged and encased in an air-tight zinc, tin, copper or lead lined coffin, hermetically sealed and inclosed in a strong wooden box.

Rule 3. Bodies dead of typhoid fever or other dangerous communicable disease not mentioned in rules 1 and 2, may be received for transportation when prepared for shipment by filling cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton, enveloping the body with a layer of cotton not less than one inch thick, wrapping in a sheet, bandaging and inclosing in an air-tight coffin. This shall apply only to bodies reaching their destination within forty-eight hours. In all other cases such bodies shall be prepared for transportation in conformity with rule 2. When the body is prepared by an embalmer holding a certificate from state board of health, air-tight sealing may be dispensed with.

Rule 4. Bodies dead of diseases that are not infectious or communicable may be received for transportation when encased in a sound coffin or casket, inclosed in a strong wooden box, provided they reach their destination within thirty hours. If they cannot reach their destination within thirty hours they must be prepared according to Rule 3. When prepared for shipment by an embalmer, holding competent certificate, air-tight sealing may be dispensed with.

Rule 5. In cases of contagious, infectious or communicable diseases the body must not be accompanied by persons or articles which have been exposed to the infection of the disease, unless certified by the health officer as having been properly disinfected. Notice must be sent to the health officer, advising the date and train on which the body may be expected. This notice must be sent by or in the name of the health officer at the initial point.

Rule 6. Every dead body must be accompanied by a person in charge, who must be provided with a passage ticket and also present a full first-class ticket marked "corpse," for the transportation of the body, and a transit permit, showing physician's or coroner's certificate, health officer's permit for removal, undertaker's certificate, name of deceased, date and hour of death, age, place of burial, cause of death, and point of shipment. The transit permit must be made in duplicate with the signatures of all attesting parties. The duplicate copies shall be sent to the secretary

of the state or provincial board of health of the state or province from which the shipment was made.

Rule 7. When dead bodies are shipped by express the whole original transit permit shall be pasted upon the outside box and the duplicate forwarded by the express agent to the secretary of the state or provincial board of health of the state or province from which such shipment was made.

Rule 8. Every disinterred body dead from any disease or cause, shall be accepted for transportation only when such removal has been approved by the health authorities having jurisdiction where such body is disinterred, and all such disinterred remains shall be inclosed in a hermetically sealed (soldered) zinc, tin or copper lined coffin.

INDIANA, IOWA, MICHIGAN AND MISSISSIPPI.

Rules relative to transportation of dead bodies same as those adopted by state of Illinois.

KANSAS.

The state board of health is authorized to prepare forms and establish regulations by which permits for transferring dead bodies of persons for burial beyond the locality where the death occurs may be issued.

The disinterment of the body of any person dead of any contagious or infectious disease is strictly prohibited unless by special permission of the local health authorities, and upon such conditions as the local health authorities may impose.

NEW JERSEY.

The body of any person dead of cholera, yellow fever, typhus fever, leprosy, plague, trichinosis, smallpox, typhoid fever, diphtheria, scarlet fever or any other contagious, infectious or communicable disease shall be accepted for transportation only when inclosed in hermetically sealed casket, license for such transport having been obtained from the local board of health of the municipality or township in which the death has occurred.

NEW MEXICO.

No regulations in force, but the board of health has ample power and authority to make such as are necessary and for the safety of the public health.

NEW YORK.

When application is made for a permit to transport a corpse over any railroad or upon any passenger steamboat within the state, the board of health, or the officers to whom such application is made, shall require such corpse to be inclosed in a hermetically sealed casket of metal or other indestructible material, if the cause of death shall have been from a contagious or infectious disease.

OHIO.

The transportation of bodies of persons dead of smallpox, diphtheria, membranous croup, Asiatic cholera, typhus fever, or yellow fever, except for burial or cremation within the jurisdiction of the health authorities of the municipality or township in which the death has occurred, is strictly forbidden.

The bodies of persons dead of other contagious, infectious or communicable diseases must be wrapped in a sheet thoroughly saturated with a strong solution of bichloride of mercury in the proportion of one ounce of bichloride of mercury to a gallon of water and encased in an air-tight zinc, tin, copper or lead lined coffin, or in an air-tight iron casket, hermetically sealed, and all inclosed in a strong, tight, wooden box.

The bodies of persons dead of diseases that are not contagious, infectious or communicable, may be received for transportation to local points in the same state when encased in a sound coffin or metallic case inclosed in a tight wooden box. But for transportation to points outside the state, unless the time required for transportation does not exceed eighteen hours, they must be encased in an air-tight coffin or casket, metal lined, hermetically sealed, and inclosed in a strong outside wooden box, provided with four iron chest handles.

Every dead body must be accompanied by a transit permit from the competent health authorities and the box containing corpse must be plainly marked with name of deceased, cause and place of death, point of shipment and number of transit permit issued in connection therewith.

PENNSYLVANIA.

The transportation of bodies of persons who shall have died from smallpox, Asiatic cholera, tyhus fever, diphtheria, or yellow fever, is strictly forbidden. From October 15 to April 1 all other dead bodies may be transported without restriction, except those which shall have died of scarlet fever, typhoid fever or measles, which must be inclosed in air-tight zinc, copper or lead lined wooden boxes, or in air-tight iron caskets, or if in any other form of coffin, said coffin must be in a hermetically sealed box, inclosed in a manner satisfactory to the local board of health or health officer.

Every dead body must be accompanied with a physician's certificate of death and a certificate from the shipping undertaker that the body has been prepared for transportation in accordance with the rules of the state board of health of the commonwealth of Pennsylvania.

Transit permits will be received for bodies shipped from, beyond, or within the states of New York, New Jersey, Delaware, Maryland,

West Virginia, or Ohio, or the Province of Ontario without subjecting the body to delay, provided the rules of the state or provincial boards of health do not conflict with any of the preceding rules in these regulations.

VIRGINIA.

No railroad corporation or other common carrier shall convey or cause to be conveyed through or from any city, town or place in this state, the body of any person who died of smallpox, Asiatic cholera, or yellow fever.

The body of any person who died of measles, diphtheria, scarlet fever, or typhoid fever, or other contagious, infectious or communicable disease, before being offered for transportation must be wrapped in a sheet thoroughly saturated with a strong solution of bichloride of mercury in the proportion of one ounce of bichloride of mercury to one gallon of water and inclosed in an air-tight coffin or casket hermetically sealed, which shall be encased in a tight wooden box of material not less than one inch in thickness. Before any dead body can be received for transportation there shall be presented to the transportation agent a certificate from an undertaker stating that the regulations have been complied with by him; also a certificate from the local health officer, or where no health officer exists, a practicing physician, stating the name, the place of death and the disease which caused the death of deceased. This certificate shall be furnished in duplicate. One copy shall be pasted on the box containing the dead body.

WEST VIRGINIA.

Rules relative to transportation of dead bodies are similar to those adopted by the state of Ohio.

INTERSTATE QUARANTINE REGULATIONS RELATIVE TO TRANSPORTATION OF DEAD BODIES.

Article III, paragraph 5, Interstate Quarantine Regulations, provide as follows: The body of any person who has died of a quarantinable disease shall not be transported save in hermetically sealed coffins, and by the order of the state or local health officer.

Trauma a Cause of Appendicitis.

By William B. Small, M. D.

[*Concluded from last issue.*]

Dr. Donovan also reports a case in a boy of nine years of age, who was jumping from a height to the ground. In three or four days appendicitis developed. The appendix was removed and recovery followed.

Dr. John Sturgis reports a case in a girl, seven years old, who fell from a swing, and developed appendicitis three days after the accident. The case was treated medically and recovered.

He also reports a case in a man, twenty-two years old, who was leading a frisking and jumping horse. In trying to hold him the man strained his side. This was on Friday. On Monday afternoon severe pain began; tumefaction and the other usual signs of appendicitis followed in rapid succession. No surgical interference was allowed. Recovery seemed perfect, and the man is now in the United States navy.

The following cases are of a slightly different class and show the effects of occupation

Dr. Donovan reports a case (seen by him in consultation) of competitive wood-sawing between two young men. The trial ended on Saturday night, and on the following Monday one of the competitors developed a well-marked case of appendicitis. The case was treated medically and the patient successfully passed through a second attack.

Dr. B. F. Sturgis of Auburn reports a case in a man who did a hard day's work in the hay field on Saturday, pitching and raking the hay. The next night it was possible to make a diagnosis of appendicitis.

Dr. Sprague of Turner reports a case of a boy of sixteen, unused to labor, who shoveled sawdust all day. Pain began within twenty-four hours, and the usual symptoms of appendicitis followed. The abdomen was opened on the tenth day. Recovery was perfect, though the wound healed slowly. It may be interesting to note that just before this boy was operated on he told some of the physicians present that his first pain was very severe, and was felt immediately after "skipping" a stone along the surface of the water on the day of his labor with the sawdust.

The same observer reports a case in a tailor who worked hard throwing wood into a shed. Another in a man who had done a severe day's work sawing ice.

Reports of such cases can be multiplied indefinitely, but I have mentioned enough to illustrate the several classes of accidents causing appendicitis, namely, external violence, direct and indirect, sudden strains, and repeated strong contractions of the abdominal muscles.

It may not be always easy to trace the relation of the cause, traumatism or strain, to the effect, appendicitis. But from my experience I believe that such a cause exists in a far greater proportion of cases than we imagine, till we search carefully for it. The relative percentage of the occurrence of appendicitis can be logically explained, to my mind, in no other way.

This explanation brings the subject into prominence from a medico-legal standpoint. Some of these cases are plainly the result of

external violence, and I believe accident insurance companies, or corporations and individuals responsible for the occurrence of the accident, are as plainly liable for them as for a broken limb. Other cases are more obscure. But of all the attacks of appendicitis of purely accidental origin which I have cited, there are none in which the liability would be less plain than in the case of pulmonary disease from injury to the shoulder, which forms the subject of an editorial in the Journal of the American Medical Association for March 19, 1898. This case has lately been on trial in one of the large cities of the union. I will quote from that editorial:

"In the case which we have referred to, a man, by occupation a grinder, and suffering from the early manifestation of 'grinder's disease' of the lungs, was thrown with considerable violence from the platform of a street car, and struck upon his right shoulder and chest with so much force as seriously to bruise the tissues over the ribs in the axillary line. Within the course of a week or two it was noticed that the man's health had become very much impaired. Shortly afterward evidences of pulmonary disease became manifest, and thirty-five days after the accident the man died. At the post-mortem examination no evidence of external injury was manifest, the ecchymosis resulting from the accident having been absorbed. One lung was found to be almost entirely consolidated and the other partially so. Scattered through both were a number of large deposits of fine metallic particles, derived from the emery wheels and the steel which he had been accustomed to grind.

"Suit was brought by the administratrix of his estate, it being claimed that his ill health and death within a short time of the accident was the result of the accident. It was admitted by the railroad company that the accident had occurred, and that, so far as the accident itself was concerned, it was responsible. The question which rested on the medical experts for decision was whether the pulmonary disease which eventually resulted in the man's death could be attributed to the accident, and the testimony was such that immediately after it was heard the railroad company sought a settlement, which was granted. It was testified that severe injury to the chest might very readily so impair the vitality of the lung as to cause the rapid spread of disease already existing, but very mild in character, or to render the lung peculiarly susceptible to any infection to which it might be exposed. If the consolidation of the lung, which finally resulted in the man's death, was due to a tuberculous process, then it would be very easy to understand how a violent injury to the chest wall might so disorganize the inflammatory exudations which had been thrown out around tuberculous and metallic deposits, that they might be broken down, thereby making open the pathways for general infection. On the other hand, it was possible that the micro-organism of pneumonia, always present in the upper respiratory passages of man, might find a ready soil for its propagation.

"This testimony is indorsed by a large amount of literature which has been accumulating during the last few years, particularly since accident insurance has become popular."

A very valuable paper bearing directly on this subject of localized infectious diseases as a sequence of slight injuries has been written by Dr. McDill of Milwaukee, in association with Mr. Van Alstine of the Chicago, Milwaukee & St. Paul Railway, and published in The Railway Surgeon of January 11, 1898. This paper considers mainly tuberculous and pneumonic infection. The conclusion is drawn by them, "that when negligence causes this injury and the injury proximately causes disease, both the injury and the disease are elements of damage in legal action."

It is well for us to bear in mind that small injuries may give rise to grave diseases, and also that this fact being known to the public, "strained relations" between cause and effect will be more frequent than ever before. Careful notes of all such cases should be kept, so that if suit be brought the full history from beginning to end may be given.

We may, I think, reasonably draw these conclusions:

1. That general prevalence of catarrhal conditions of the bowels, perhaps as an accompaniment or result of the grippe, is responsible for a large part of the general increase in prevalence of appendicitis.

2. That accidental injuries, strains and work demanding strong contraction of the abdominal muscles may be held accountable for the greater prevalence of the disease in males.

3. That such injuries and strains act by forcing material, loaded with the bacteria which produce appendicitis, from the cæcum into the vermiform appendix.

4. That in consequence of the irritation of such material or from some other cause, these germs here find a favorable soil for their multiplication and development.

5. That in common with other germ diseases a time of incubation must elapse (for the multiplication of these germs) before symptoms sufficiently marked to prove characteristics of appendicitis can appear.

6. That the disease is of growing medico-legal importance, as many cases are of traumatic origin, and may therefore give rise to proper suits for damage or valid claims against accident insurance companies.—Medical Record.

Contused Wounds of the Abdomen and Their Surgical Treatment.

By John T. Rogers, M D.

The erect posture of man and the inadequate protection afforded to the viscera by the abdominal walls subject the abdominal contents to various injuries, not the least infrequent of which are abdominal contusions. Our text-books dismiss the subject with unsatisfactory instructions as to diagnosis, symptoms and treatment, some authors even failing to mention that contusions of the abdomen ever occur. The literature of the present day is likewise incomplete and unsatisfactory in its treatment of this condition. That more cases are not reported in our journals is, I believe, due to the fact that almost all grave contusions of the abdomen result fatally, and we are very loath to report our unfavorable cases, even to the medical profession. The writer hopes that the discussion of his paper will bring forth the reports of many cases which he feels sure have occurred in the practice of the members of this society. My object will have been accomplished if I succeed in interesting you sufficiently to induce you to report your cases, not only to the society, but to the journals, thus enabling the profession at large better to understand this condition, and to treat it more intelligently than has been done in the past. Reports of cases with comments by experienced men are, to my mind, better educators on any surgical subject than lengthy articles based upon theoretical knowledge.

Abdominal contusions most often result from kicks from beast or man, blows with blunt instruments, squeezing between two heavy bodies, and, from the nature of their occupation, lumbermen in the woods or sawmills are frequently the recipients of such injuries.

Symptoms.—From the very extensive distribution of the sympathetic to the abdominal contents, it would be but natural to expect to have shock as a symptom of prime importance. That there are exceptional cases in which no shock is manifest only goes to prove the rule. It is present in nearly every case to a greater or less degree, depending upon the nature of the injury, its location, the character of the vulnerating force, and upon the condition of the abdominal walls and contents of the abdomen at the time of injury. A blow applied directly over the solar plexus always causes a great degree of shock, and has been known to produce death, without injury to the abdominal wall or to the contents of the abdomen. In many cases there is no external evidence of violence to the abdominal wall, or, when present, may be of so slight a nature as to cause little or no attention.

On the other hand, there may be extensive contusion and laceration of the abdominal walls, without injury to the contents of the abdomen. Severe pain, nausea, and vomiting, immediately following or accompanying shock, may be taken as evidence of grave abdominal injury. Obstipation is usually marked.

Great anxiety, restlessness, and fear of impending death are pronounced. Bryant, Hitchcock, and Lambert each report a case in which none of these symptoms were present. The patients in each instance walked for a considerable distance with their intestinal contents in the peritoneal cavity. Usually, however, the pain is excruciating, especially at the seat of injury. Vomiting is continuous. There are great prostration, lividity of lips, and extreme pallor; the pulse is small, rapid and irregular; respiration is shallow; there are subnormal temperature, leaky skin, and rapidly developing tympanites, due to intestinal paralysis or to the escape of gas from the intestine. Extreme rigidity of the abdominal walls is, perhaps, the most important and characteristic symptom. It is present in every case and may be considered almost pathognomonic of grave intra-abdominal lesion. Deaver says he has seen this condition so pronounced as to call to mind the checkerboard appearance of the normal abdominal walls as represented by artists of former times. In those cases which I shall report later (all of which were fatal), this boardy condition was present in a marked degree. The character of the vomiting was varied from the simple expulsion of the stomach contents to the most violent retching or regurgitation of the intestinal contents, always an evidence of grave abdominal lesions.

Pathology.—Contusions of the abdomen may produce lesions of any of the abdominal viscera. The alimentary tract, being least protected, is most often the seat of grave injury. Seventy-five per cent. of these lesions occur in the small intestines, the rupture usually taking place outside of the mesenteric attachment. It is generally conceded to be due to squeezing of the intestine between the compressed abdominal wall and the vertebral column. Intestines distended with gas or fæces are more apt to be injured than is the collapsed bowel.

Diagnosis.—The chief points to be considered in making the diagnosis of grave intra-abdominal lesions are the history of the injury, location of the injury, character of the vulnerating force, rigidity or boardy condition of the abdominal walls, obstipation, vomiting, pain, anxiety, and restlessness, the degree of shock and prostration. The pulse and temperature, while not to be depended upon in making a diagnosis, may be taken as reasonably safe guides in making a prognosis. Depending upon the degree of shock, the pulse is at first rapid, irregular and weak; temperature subnormal or normal. In favorable cases the pulse becomes stronger and regular, temperature normal or above normal. In un-

favorable cases the pulse continues weak, intermittent, becoming hard and wiry; temperature fails to reach normal, or there rapidly supervenes a condition of hyperpyrexia. If there be as a result of the contusion lesions of abdominal viscera other than the intestinal tract, the symptoms will be chiefly those of internal hemorrhage and the various other symptoms referable to the particular organ injured. A detailed description of injuries to the liver, kidneys, spleen, pancreas, mesentery or omentum and bladder would require too much time to discuss here. Thomas Bryant, in the London Lancet, December 7, 1897, says: "The character of the force and the mode of its application always appear to be of much value as a help to diagnosis in most cases of intestinal injury, for it would seem that when the force is of a diffused rather than a localized character the injury is more likely to be extensive, or even double. Thus, when a human being is run over, the wheel of a vehicle passing over the abdomen or the back, with the abdomen downward; when he falls from a height, upon a plank or beam; is trodden on by a horse or is crushed between two obtuse bodies, it is more probable that a solid viscus has been lacerated or that some portion of the small intestine has been torn in one or more places."

Statistics in 149 cases, in which various degrees of rupture of the intestinal tract had occurred, give clearly the history of 80 of these cases. Thirty-six cases were due to horse kicks, 23 to carriage wheels, 13 to kicks from men, and 8 from spent shell fragments or bullets.*

Course and Prognosis.—Without immediate surgical interference I believe that not one in one hundred cases of severe abdominal contusion ends in recovery. Sajous' "Annual" puts the mortality at 96 per cent. Without operation these patients, when they recover from the primary shock, rapidly develop septic general peritonitis and die, or else, especially in injuries to the liver and spleen, they die of hemorrhage. Rupture of one kidney when the other is normal may result in recovery. Rupture of the bladder results fatally if early operation and drainage are not resorted to.

Treatment.—My experience with abdominal contusions and a careful study of all the literature at my disposal teach me to say unhesitatingly that the most conservative treatment is early operation, and I mean by "early operation" as soon after the receipt of the injury as possible; immediately, if the patient is not in collapse. The advances in modern surgery have made it possible to explore the abdomen with impunity and with almost absolute safety. I believe it is better surgery to open the abdomen in doubtful cases and find no lesion, than to wait in a single instance until signs of septic peritonitis are present. An aseptic exploration will do no harm, while delay means death in 96 per cent. of all cases of rupture of the intestine.

The patient should be as carefully prepared as rapidity of action will allow, and a free incision made in the median line and the injured organ located as quickly as possible. Oftentimes this is a difficult procedure. In locating the seat of injury it is important to bear in mind the exact point at which the violence was applied. Immediately upon an injury of this character there is a paralysis of the bowels, and in most cases the rupture will be found immediately beneath the point where the vulnerating force came in contact with the abdominal wall. Of further importance, I believe, is the action of the omentum, especially in those cases in which considerable time has elapsed after the receipt of the injury. It seems to me that in many, if not all, cases of rupture or injury to the viscera, the omentum throws itself into the breach, and endeavors, by adhering to the wounded organ, to protect the general cavity from infection. A large portion of the omentum will be found adherent at the point of rupture. If this is a fact, you can readily see that it would add much to our ease in locating the injury. Prognosis is much more unfavorable if it becomes necessary in any case to expose the intestinal coils. However careful we may be to keep them protected by hot towels, this procedure adds much to the shock of the operation; so much, indeed, that death almost invariably occurs when evisceration is necessary. I doubt exceedingly whether such a procedure is ever necesary, or whether ever justifiable.

After the ruptured intestine is found, pull out only so much as is required for rapid closure of the rent; close it in the usual way, remove all septic material possible by carefully mopping out the cavity with soft gauze sponges.

When nature has had no opportunity to wall off the septic area it seems proper and becomes a great temptation to irrigate the cavity with warm saline solution. But if we stop for a moment to consider briefly the physiology of the peritoneum in its relations to absorption, I think it will be seen that irrigation under these circumstances is an unsurgical procedure. Byron Robinson's conclusions, based upon a thorough study of the subject and much personal experimentation, are as follows:

"1st. The primary path by which fluids pass from the peritoneum into the circulation is by way of the lymphatics. The secondary path is the blood vessels.

"2d. A stream of fluid exists in the peritoneum directed toward the diaphragm.

"3d. The anatomical structure and physiologic function (respiration) of the diaphragm enable it to act like a suction and a force pump.

*Charassi, French Congress of Surgeons, 1885.

"4th. In five minutes after injection into the abdomen of a solution holding Berlin blue in suspension, the colored granules may be found in the subdiaphragmatic lymph bed and intrathoracic glands.

"5th. So far as my experiments extend, the diaphragm is the primary locality of peritoneal absorption of solid granules. Others assert that the rootlets of the portal veins also absorb fluid, but I have not been able to confirm the correctness of the assertion.

"6th. The vast function of absorption performed by the diaphragm and the very small part taken in this process by other portions of the peritoneum account for the non-fatality in the purulent conditions found at the tubal ends and about the appendix and the ruptured gall bladder, which is circumscribed and confined by the ligamentum hepatico-colicum. The virulent microbes or their products are not absorbed but circumscribed."

On account of vigorous absorptive powers, the nearer peritonitis approaches the diaphragm the more dangerous it is to life. Practical experience in irrigating in cases of septic peritonitis convinces me that it should be abandoned. Gently mopping out the cavity and thorough gauze drainage will give better results. If the liver has been ruptured our efforts of course will be directed to controlling hemorrhage, which is best done by packing. The same is true for ruptured spleen, when there is only a slight tear. Rapidly fatal hemorrhage supervenes when the rupture is extensive. Owing to the fact that both kidneys are rarely affected by the same force, injuries to these organs are not so fatal in their results. When laceration is not extensive and hemorrhage is not severe, recovery may take place without surgical interference. If, however, the shock has been great and there be present evidence of great laceration of one kidney, nephrotomy and drainage or nephrectomy is indicated. Rupture of the bladder, intraperitoneally or extraperitoneally, requires immediate operation for repairs and drainage. I consider the suprapubic method the best procedure. In all operations for the repair of injuries of the abdominal viscera there is great shock, and it becomes our duty to minimize this element by every means in our power. We should operate rapidly, the room should be kept at a proper temperature, hot water bottles or bags should be constantly applied, even in the warmest room. Infusion or hypodermoclysis with decinormal saline solution is almost always indicated, both during and after operation. Repeated infusions may occasionally carry a desperate case over a period of shock. The after-treatment of these cases is the same as for an ordinary laparotomy.

Report of Cases.—Case I.—Mr. A., Swede, occupation, molder; good habits. At the time of admission to Dr. C. A. Wheaton's service at the City and County Hospital, he was in general appearance very much emaciated. Face pinched and anxious, eyes sunken, skin dry, tongue dry and coated. Very weak; persistent diarrhœa; pain in abdomen very severe; great rigidity of abdominal wall. Temperature, 97.8 degrees F.; pulse, 85; breathing labored. Abdomen retracted and very tender on palpation. Temperature remained between 97 degrees and 97.5 degrees F.; pulse, 80 and 85 during his stay in the hospital. Stools yellow and watery and very offensive in odor; no emesis. Admitted January 30, 1898. On January 20, while feeding a buzzsaw, a board thrown back from the saw struck him across the abdomen, necessitating his quitting work and removal to his home. He says he was very weak at the time, but did not suffer much pain until evening, when vomiting ceased. It commenced again on the following day and had been persistent since. Diagnosis, intestinal gangrene with localized peritonitis. Death occurred February 1.

Case II. Mr. B., admitted to the service of Dr. C. A. Wheaton Oct. 25, 1898; aged 37 years; male, white, English; occupation, veterinary surgeon; habits good. Three days previous to admission, while operating on a horse, he was kicked in the left hypochondriac region. No external injury. Watch case slightly indented. Hiccough commenced immediately after the injury, and was incessant except during a few snatches of sleep. No gas passed per rectum. Stercoraceous vomiting commenced the following day. On admission, hiccoughing, complete obstruction of the bowels; intermittent stercoraceous vomiting; abdomen markedly distended, rigid, and tender; tympanitic from level of the umbilicus on either side downward. Temperature, 98 degrees F.; pulse, 120. At 7 p. m. was taken to the operating room and abdominal section was made by Dr. C. A. Wheaton. Cavity filled with a pea-soup material, fæcal in odor. Intestines injected. Small intestine picked up and inspected and a couple of perforations found. Some deposits of lymph about them. These were closed with three rows of Lembert sutures. Cavity flushed out with saline solution. Patient moribund when taken from operating room. Abdomen closed with interrupted wire sutures. Death occurred about two minutes after removal from operating room.

Case III. Mr. C., laborer, aged 25 years; white, American; habits good. Admitted to hospital March 26, 1898. At the time of admission he was a well developed, rugged man. Mental condition good. Between 4 and 5 o'clock on the afternoon of admission he was kicked in the left upper quadrant of the abdomen by a horse, which caused sufficient pain and shock to cause him to lie down, but did not render him unconscious. A physician was

called and gave an opiate. The man was sent to the hospital. On admission at 11 p. m. he was in great pain; shock severe. Pain continued to be very severe; vomiting; no passage of gas or fæcal matter; abdomen rigid and tense; tympanites not marked; great pain to the left and below the umbilicus. At 2 p. m. I made an abdominal section and found a couple of lacerations in the jejunum near the duodenal junction. Ruptures repaired; cavity irrigated with decinormal saline solution, drained and closed with interrupted sutures. Patient suffered severe shock following operation; transfusion of saline solution rallied him for a while, but only temporarily. Died at 1:15 a. m., March 28. Diagnosis, rupture of intestine, general peritonitis.

Case IV.—Dr. D., white, aged 35 years; large, well-developed man. Was coasting down-hill in front of a bobsled. When two-thirds of the way down, while going at a terrific rate of speed, he struck another bobsled, which was being drawn across the path. He was unconscious for a few minutes after the receipt of the injury. I saw the patient within fifteen minutes after injury. He was then suffering excruciating pain. Pallor extreme, skin leaky, severe shock. He was removed to the hospital. Pain continued; vomiting; pulse became intermittent and weak; distension of abdomen, complete obstipation, great tenderness and rigidity of abdomen. No external evidence of violence. Great restlessness and anxiety. Temperature subnormal; respiration shallow and labored. Died on the third day. Diagnosis, general septic peritonitis, probable rupture of the intestines. No operation; no post mortem.—Med. Record.

Notices and Reviews.

"Accidents and Injury; Their relation to Diseases of the Nervous System." By Pearce Bailey, A. M., M. D., Attending Physician to Department of Correction, etc; Assistant in Neurology, Columbia University. Consulting Neurologist to St. Luke's Hospital. 8vo, pp. 430. New York: D. Appleton & Co. Chicago: E. H. Colegrove. 1898.

No papers upon traumatic neuroses have been read with greater satisfaction than those which this author has contributed, and those who have had the pleasure of reading even one of them will be interested in learning of the publication of a large volume upon the diseases of the nervous system following traumatism by Dr. Bailey. The author states in the preface that he had contemplated a smaller work upon diseases usually classed as traumatic neuroses, but as the preparation progressed, elaboration became imperative, and, therefore, a more complete treatise was produced.

Diseases of the nervous system are by common consent divided into those producing definite lesions of the nervous apparatus—organic, and those for which as yet no definite pathology has been found—functional. In order that the reader may be able to diagnose the latter, it is, of course, essential that he should be able to recognize the former and to differentiate between both classes and malingering.

To facilitate an intelligent study of the various subjects, the author very properly devotes several chapters to preliminary subjects. Under the general heading of Introduction, several chapters are devoted to the consideration of the Previous History of the Patient, History of the Accident, Physical Evidences of Predisposition to Nervous Diseases, and The Examination for the Actual Injury. Of the pages assigned to brief and lucid reviews of the most essential elements of these phases of the examination, over half are devoted to the physical examination, in which the most reliable means and methods of detecting evidences of disturbances of the nervous system are described. The remaining pages—nearly 400—are devoted to a thoroughly scientific consideration of the various diseases of the nervous system and allied conditions, and are divided into four parts.

Part I. comprises chapters on Organic Effects of Injuries to the Brain, Spinal Cord, Peripheral Nerves and the Ultimate Organic Effects of Injuries.

These chapters furnish a very clear consideration of each of these conditions. The symptomatology is especially complete and satisfactory. The various traumatic lesions of each of the organs and neurons are carefully differentiated. While the author still clings to the use of the term cerebral concussion in its obsolete sense, he makes frequent reference to laceration of tissue and extravasation of blood, indicating his belief in the limitation of the effects of simple, uncomplicated concussion. That hæmorrhages into and about the cord are of comparatively common occurrence is, of course, admitted, but their causation by anything short of the application of a severe force, which is usually so great as to damage the continuity of the spinal column or overlying soft parts, is strongly refuted upon anatomical grounds. The injuries which are followed by

definite or positive lesions of the spinal cord are strangely, even phenomenally, non-productive of symptoms of the so-called functional disorders. The author justly admits the impossibility of stating positively whether or not concussion of the spinal cord can exist. He, however, does state that, if it does, it is one of the rarest accidents to the nervous system.

Part II. is devoted to that very large class of disorders collected under the general term, Functional Effects of Injury—conditions dependent upon as yet unknown lesions of the nervous system.

After extensive discussion of nomenclature, pathology, etiology and symptomatology, the various symptoms which have been grouped under Traumatic Neurasthenia and Traumatic Hysteria, are considered, and then a chapter is given to the Unclassified Forms. This provides an avenue of escape for our ignorance, which all must admit exists to a marked degree as to disorders of this character. This class comprises some of the most varied and fatal forms, the definite pathology of which will be necessary to admit of their proper classification.

Part III. considers Malingering Exaggeration, substitution and simulation are presented in their numerous aspects, and collectively these chapters are amongst the most interesting in the volume. The effect of commercialism upon the common individual is well shown both by words and figures. If the commercial spirit in this direction is continually progressing, we may properly wonder as to what we are coming to.

Part IV. is devoted to that important phase of the subjects, Treatment. The author has made an heroic effort to elucidate the subject and to classify the fog of ignorance which is generally admitted to enshroud this whole subject in uncertainty and mystery. Having ascertained the nature of the disease, the next most important subject is, "What is to be done about it?"

The Rest Cure, comprising physical and mental quietude, isolation, massage, electricity, diet, etc., as devised by Weir Mitchell, is given full prominence and favor in the treatment of this class of diseases. Instruction is given as to the general management of cases. The use of water—Hydriatics—both internally and externally, is extolled as second in efficiency only to the Rest Cure.

Hypnotism in its broadest sense, including general mental suggestion, is commended, but the use of hypnosis as a therapeutic measure is advised only in otherwise hopeless cases. It would naturally seem that if a certain plan of treatment relieved or improved some desperate or hopeless cases, that it would surely be of greater service in cases of milder degree. Hypnotism is a valuable adjunct to other therapeutic measures, and if there are any conditions of the body in which its use would appear to be indicated, it would certainly be in the functional disorders of the nervous system, and especially of the mind. Exercise, counter-irritants, change of climate, etc., are recognized as of value in some cases, but the use of drugs is generally discouraged, and at most they are to be considered subsidary to other measures.

This neat and attractive book is unique in its scope, and is quite a novelty in that it is confined to its proclaimed purpose. In other words, the author has taken an unusual text, but confined himself strictly to it. The book represents a vast amount of study and research. The profession generally, and railway surgeons and neurologists especially, are to be congratulated upon the appearance of this treatise. One of the best features of the work is that it is distinctly of the Pearce Bailey type—which is a guarantee of its completeness and modernness, and its authoritativeness.

Every railway surgeon should study these pages from cover to cover.

BOUFFLEUR.

"Atlas of Syphilis and the Venereal Diseases." By Professor Dr. Franz Mracek of Vienna. Edited by L. Bolton Bangs, M. D. With 71 colored plates from original water-colors by A. Schmitson. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Price, $3.50.

This is one of the Lehmann series of atlases, and consists of seventy-one very lifelike colored plates, with accompanying text. The plates were all drawn from cases in Mracek's wards in the Rudolfsspital, Vienna, and only the types of venereal disease ordinarily met with are figured. The writer believes that a judicious exhibition of some of these plates would do far more good than all the White Cross societies in existence. In addition to the

explanations for each plate, which give a short history of the case, there are some 120 pages of text at the end, and, unlike other volumes of the series, the treatment is considered. In some respects this is not satisfactory, but the excellent plates overbalance this minor fault.

Notes of Societies.

The New York State Association of Railway Surgeons elected the following officers at its last meeting: President, Theodore D. Mills, Middletown; vice-presidents, J. L. Eddy, Olean and G. N. Hall, Binghamton; secretary, C. B. Herrick, Troy; treasurer, H. P. Jack, Canisteo.

The Association of Big Four Railway Surgeons held its annual meeting in Cincinnati November 9. The following officers for the ensuing year were elected: President, Dr. G. W. H. Kemper, Muncie, Ind.; first vice-president, Dr. F. R. Graves, Franklin, O.; second vice-president, Dr. E. Mammen, Bloomington, Ill.; third vice-president, Dr. F. P. Satterwhite, Louisville, Ky.; fourth vice-president, Dr. J. L. Wiggins, East St. Louis, Ill.; secretary and treasurer, Dr. T. C. Kennedy, Shelbyville, Ind.

Personal.

Dr. Francis B. Fite of Muscogee read a paper at the recent meeting of the Indian Territory Medical Association.

Dr. H. A. Leipziger of Burlington, Iowa, whose paper on "Random Clinical Notes" appeared in the last number of the "Railway Surgeon," was recently elected president of the Eastern Iowa District Medical Society.

Railway Miscellany.

H. C. Parker, agent of the Merchants' Dispatch at Kansas City, Mo., died in that city, December 1.

Christian F. Hagan, traffic manager of the Ward Steamship line, died at New York December 12, at the age of 42 years.

John L. Gardner, a director of the Chicago, Burlington & Quincy, died at his residence in Boston, December 10, from a stroke of apoplexy, aged 62 years.

A movement to establish a home for disabled and incapacitated railroad men in some city with climatic advantages has been started by Eli Hirshfield of Fort Worth, Texas, assistant general passenger agent of the Fort Worth & Denver City road. His plan is to have the city and the railroads erect the building and to secure small contributions from railway men throughout the United States to maintain the home.

George F. Gardner, formerly master mechanic of the Columbus, Sandusky & Hocking, died December 9, at Eldorado Springs, Mo., where he had gone for the benefit of his health. He was 58 years of age.

Dr. Dudley took up the subject of specifications and showed how they are built up and the methods of obtaining the information from which they are compiled. As an illustration he gave in detail the Pennsylvania railroad specification for car axles.

William N. Bolling, real estate agent of the Baltimore & Ohio, died at his home in Baltimore, Md., December 6, from a stroke of paralysis. He was 68 years of age, and was connected with the engineering department of the B. & O. before being made real estate agent.

He showed that it was the duty of the chemist not only to write specifications and test materials, but to investigate special problems on a great variety of subjects, and related many instances from his own experience which showed the wide range of information and ingenious application of new methods which have been called into play in the solution of various problems which have arisen.

Charles P. McFadden, general ticket agent of the Manhattan railway (elevated) of New York, died at his home at Long Branch, N. J., December 2, after an illness of two or three months. He was born at Lewisburg, Pa., about 1840, and had been in railway service since 1866. For thirteen years he was connected with the freight departments of the Raritan & Delaware Bay and the New Jersey Southern railroads, and was for some time general passenger agent of the latter. He had been general ticket agent of the Manhattan railway since November, 1879.

If the wishes of the management of the Chicago, Milwaukee & St. Paul are respected, that system will hereafter be referred to as the "Milwaukee road" instead of the "St. Paul road," where abbreviation is found convenient. General freight agent Hiland has addressed the following letter on the subject to first assistant general freight agent Keyes at Milwaukee: "It has been suggested that, in referring to the Chicago, Milwaukee & St. Paul railway, the name 'Milwaukee road' should always be used instead of 'St. Paul road,' as has been done in some cases heretofore, the idea being to make the former strictly distinctive and educate the public into calling the company the Milwaukee road." According to the Evening Wisconsin of Milwaukee, the people of that city and Wisconsin are the ones who need educating in this re-

spect, as it has become a habit with them to refer to it as the "St. Paul road," while the people of St. Paul and Minnesota almost universally use the term "Milwaukee road."

A judgment for $6,000 secured against the Kansas City, Pittsburg & Gulf by Grant Grattis, a fireman, for injuries received through the negligence of the engineer, was reversed in the Missouri Supreme Court at Jefferson City, December 8. The injury was received while the engineer was acting under orders from the conductor in entering a sidetrack on which there were a large number of cars standing, and after the fireman had warned the engineer that there was danger in the attempt. The court holds that the plaintiff was a fellow-servant with the engineer, and that, therefore, the company was not liable; that the engineer was alone liable to the plaintiff for injuries sustained. Judge Brace dissented from the opinion, which was written by Judge Marshall.

Daniel D. Davis, auditor of the Toledo, St. Louis & Kansas City, died at Cedar Rapids, Neb., November 29, from a stroke of paralysis. He was born at Stockholm, N. Y., Oct. 14, 1865, and entered railway service in 1865 as a clerk in the accounting department of the Michigan Central. In 1870 he was made chief clerk to the freight auditor of the same road, and from 1870 to 1879 was chief clerk to the assistant general freight agent. He was then for two years chief clerk of the general freight and passenger office, and auditor of the Detroit & Bay City, and in 1881 was local agent of the Michigan Central at Bay City, Mich. He was made car accountant and general car agent of the latter road in 1882, and in 1884 accepted the position of freight auditor of the Union Pacific. After holding that position for three years he became auditor of the Toledo, St. Louis & Kansas City in 1887.

R. B. F. Peirce, general manager of the Indiana, Decatur & Western, and until recently receiver of the Toledo, St. Louis & Kansas City, died suddenly at his home in Indianapolis, Ind., December 5, of heart disease. He had been in poor health for some time past, and was recently taken suddenly ill at Cincinnati. Upon the advice of his physician he resigned as receiver of the Toledo, St. Louis & Kansas City, and was preparing to go to California to take a needed rest. Mr. Peirce was born at Laurel, Ind., Feb. 17, 1843, and after leaving college studied law and was admitted to the bar about 1867. In 1873 he was appointed general counsel of the Logansport, Crawfordsville & Southwestern railway, and remained in its service until the road was sold under foreclosure, and became a part of the Vandalia. He was elected to Congress from an Indiana district in 1880, and upon the expiration of his term resumed the practice of law. In 1885 he was appointed attorney for the receiver of the Indianapolis, Decatur & Springfield, now the Indiana, Decatur & Western, and in 1889 was made one of the trustees for the first mortgage bondholders. Upon the sale and reorganization of the road in May, 1894, he was made general manager, which position he still held at the time of his death. He was appointed receiver of the Toledo, St. Louis & Kansas City early in 1895, to succeed S. R. Callaway.

The first lecture of the Purdue railway course for the season of 1898-9 was given on November 29 by Dr. Charles B. Dudley, chief chemist of the Pennsylvania railroad. Dr. Dudley's subject was "The Relation of Chemistry to the Railroad." The speaker first gave some interesting figures on the amounts of money spent by the railroads for various materials, which very forcibly illustrated the immense importance of the departments of chemical and physical testing and inspection. He said that the purchasing agent of the Pennsylvania railroad spends from $17,000,000 to $20,000,000 a year, and of that amount about $5,000 goes for rubber bands, $7,000 for lead pencils, $1,000 for pins, $5,000 for ink, $2,000 for toilet soap, $1,000,000 for lumber, $60,000 for hose, and called attention to the very interesting fact that it costs nearly as much for stationery with which to carry on the business of the road as it does for iron. The duties and responsibilities of the inspector were then described and his work illustrated by reference to numerous actual cases.

A Washington dispatch of December 8 says: "Senator Pettigrew, by request, introduced a bill for the operation by the government of the entire railway systems of the United States, fixing rates for passengers, sleeping-car, freight and express traffic, and incidentally that of postage. It consolidates the interstate commerce commission and the postoffice department and directs the consolidated department, under the direction of the postmaster-general, to lease or take possession of railroads upon six months' notice, the rentals to be on a basis of the earnings of the respective roads for the fiscal year, 1897. The department is to operate the roads so leased, and the employes are to work not more than eight hours a day. Passenger, sleeping-car and freight rates fixed are greatly below those now in force; penny postage is provided for first-class matter, and a parcel post system replaces the work now performed by express companies. The passenger rates vary according to accommodations and the speed of trains, the former being divided into "ordinary" and "palace car" rates. Within a distance of 15 miles the minimum charge is 5 cents for the trip, and within 40 miles the fare is 25 cents."

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THE QUESTION OF WHAT PRODUCES, AND WHAT PREVENTS, ANKYLOSIS OF JOINTS.

By A. M. Phelps, M. D., of New York.
Professor of Surgery University of Vermont, and of Orthopædic Surgery in the New York Post-Graduate School, Surgeon to the City Hospital, etc.

In the July number of The Railway Surgeon, Vol. V, is an article by Dr. O. W. Phelps of Britt, Iowa, on "What Produces Ankylosis of Joints." The article in question, together with its experiments and conclusions, so closely resembles an article which I published in 1890 in the "Loomis Laboratory Researches," No. 1, and also in the "Transactions of the New York State Medical Society" for that year, that I feel it might be interesting to the readers of The Railway Surgeon to reproduce in part the article, together with the experiments and illustrations. I do this to establish priority of original work, and believe that if Dr. Phelps had known of these experiments and conclusions he certainly would have given me due credit for them in his interesting article. I have added a few remarks on the treatment of hip-joint disease which were not printed in the original article.

To determine the question of whether prolonged fixation of a joint would result in ankylosis of it, I performed a series of experiments in the Loomis Laboratory, assisted by Prof. W. Gilman Thompson and his assistant, Dr. J. C. Cardwell. The result of these experiments will be found published in the researches of that laboratory for 1890, and from which I desire to quote:

"It has been taught that if a normal joint is fixed immovably for a certain length of time ankylosis will certainly result, and that motion is necessary to preserve the normal integrity of the joint; that an inflamed joint will become ankylosed if it is not moved. Our textbooks on surgery are filled with notes warning against prolonged immobilization in the treatment of fractures, or of inflamed joints in cases where immobilizing appliances are used, lest ankylosis result. It was these, to my mind, erroneous propositions which led to the experiments above referred to. Four dogs were selected and their limbs immobilized.

"The difficulty of keeping the limbs of animals secured in one position for a long period, together with the possibilities of disease and excoriations, will, I think, be apparent to all. Dogs are quite liable to contract mange and infect the other animals, necessitating their immediate removal. And then they do not bear confinement well in a cramped, unnatural position. However, with all of these difficulties to overcome, we succeeded in keeping one dog six weeks, one dog three months and a half, and two for five months, lacking one week.

"The first dog, killed at the end of six weeks, was less than one year old. He had been dressed in the following manner. Under ether, the hindleg was carefully enveloped with cotton batting. Over this was applied a roller and a plaster-of-Paris bandage, the leg being held in a straight position until the plaster became hard. The body of the dog was now similarly dressed with cotton batting and roller. A few turns of the plaster-of-Paris bandage around the body, finally including the leg, which was drawn well up over the back of the dog, completed the work of immobilizing. (See Fig. 1.)

"This secured the hindleg to the plaster cast, which was closely fitted to the body, making dog, cast and leg one piece, as it were. The leg, being drawn up over the back in this position, induced considerable intra-articular pressure at the hip-joint by putting the muscles and ligaments upon the stretch, the leg being used as a lever. The dog did very well for a few weeks, there being but slight rise of temperature, but at the end of the fifth week

he refused to eat and began to emaciate. A week later, on the forty-second day, he was killed. An excoriation, due to pressure, was found below the knee upon removing the dressings. This accounted for the loss of appetite. The ankle and knee joints were normal in every respect.

"Upon opening the hip-joint, however, the normal amount of synovial fluid escaping, a dark congested spot was found on the head of the bone which corresponded to a similar one in the acetabulum, marking the points of contact between the head and the socket. There was also a dusky appearance of the entire head of the bone and the ligamentum teres, closely resembling the congestive stage of inflammation. The synovial membrane was normal. (See Fig. 2.)

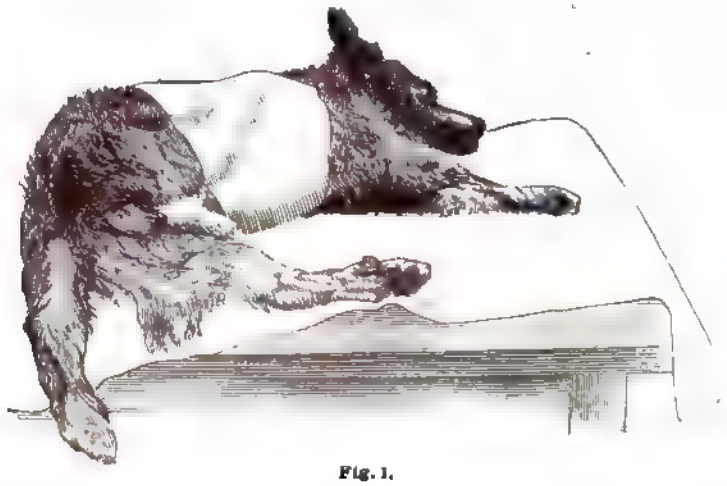


Fig. 1.

"A section was made of the head of the femur, and another which divided one of the halves again into two equal parts, the cut passing through the congested spot. (Figs. 3, 5 and 6.)

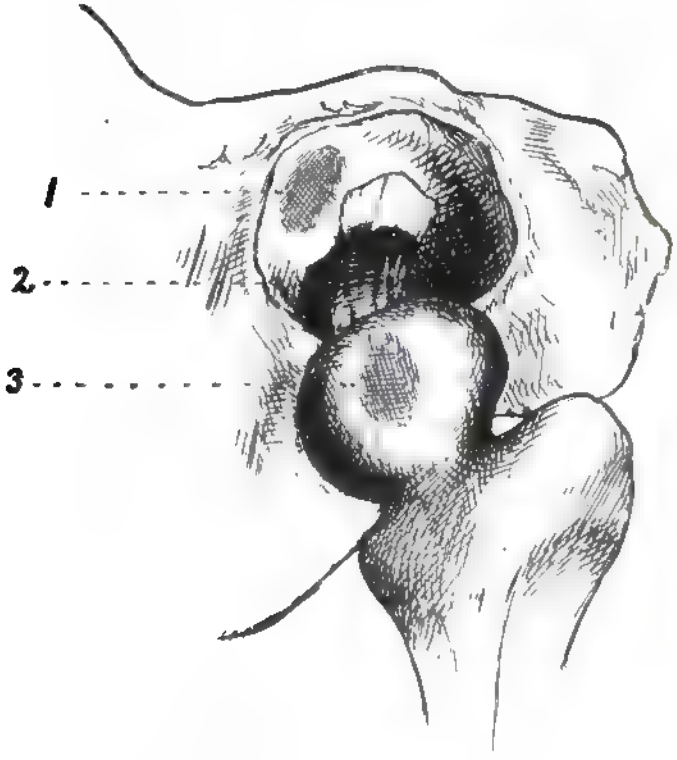


Fig. 2.

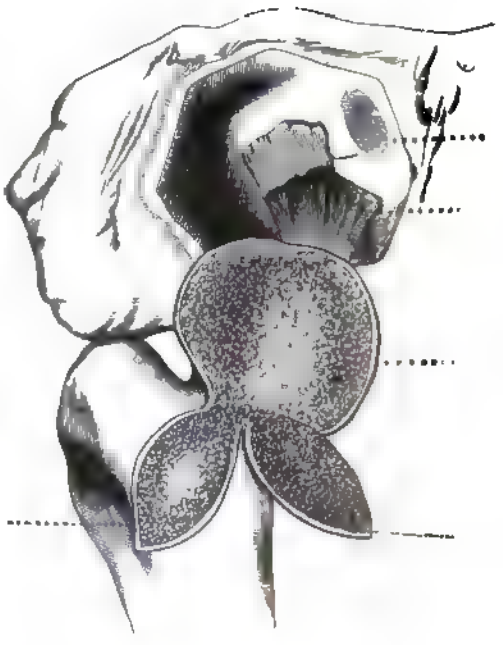


Fig. 3.

"(See Fig. 3, which was drawn on a block, reversed by mistake, and photographed.) Immediately underneath the cartilage and ex-

tending to a considerable depth into the head of the bone, the cancellated structure was deeply congested (4), due to the bone being filled with coagulated blood. The center of the head, however, was of a lighter color, and to the eye it appeared normal. This light streak in the center of the bone grew lighter and wider as it extended toward the ligamentum teres, which was due, probably, to a more perfect circulation of blood and better nutrition than exists in the more peripheral portions; six is the congested spot in the acetabulum. Dr. J. H. Linsley made a section of the bone for microscopical examination, but during the decalcifying process, which was necessary before sections could be made, the coagulated blood was washed out of the interstices, and the specimens presented nearly the normal appearance microscopically. I neglected to state that the muscles of the leg were considerably atrophied.

"The other three dogs were treated similarly to the first, only the foreleg was substituted for the hindleg. The foreleg is easily To prevent the dogs from gnawing the dressings away, which they would surely do if allowed, the plaster-of-Paris bandage was carried forward on to the neck, making a stiff collar, which kept the heads always to the front. (See Fig. 4.) This precaution will be found useful in other kinds of experiments to secured to the body immovably with plaster-of-Paris, and the dressings are not so likely to become filthy as when the hindleg is used. prevent dogs from using their teeth upon dressing or apparatus.

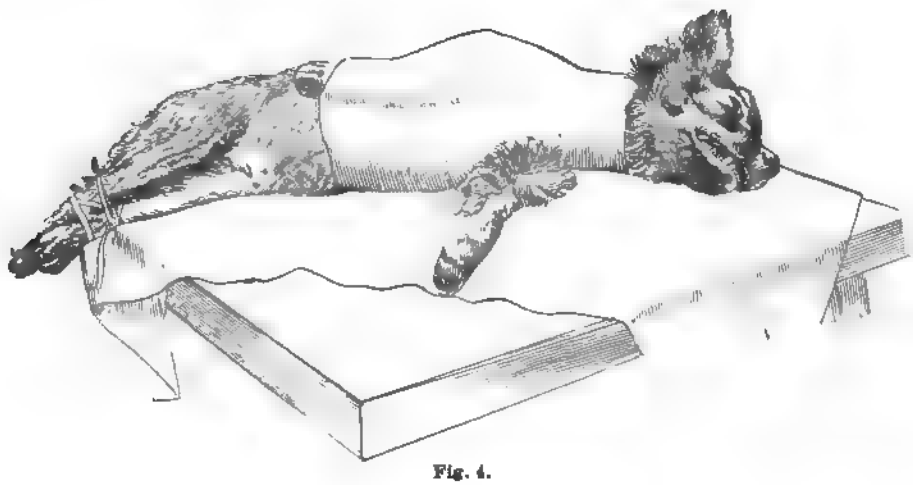


Fig. 4.

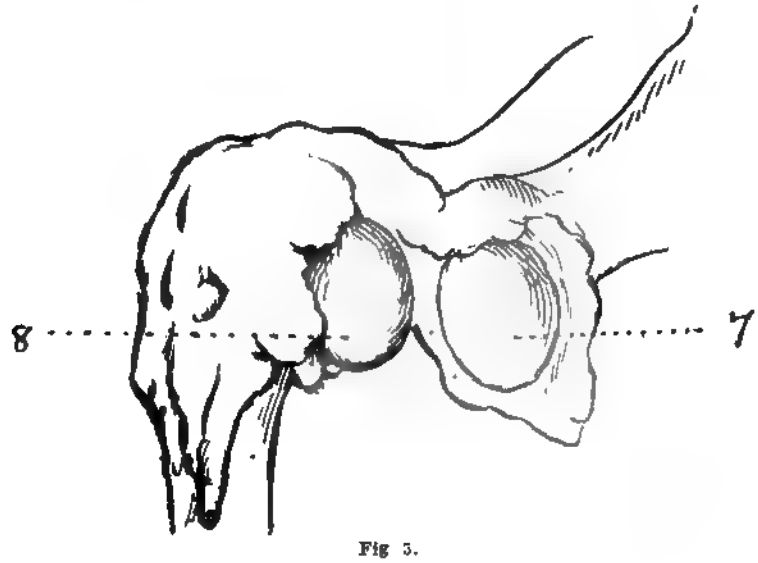


Fig 5.

"Dog No. 2 was killed at the end of three months and a half. Every joint presented a perfectly normal appearance. Where the head of the humerus rested against the glenoid cavity there appeared to be a little deeper bluish hue of the articular cartilage.

There was more atrophy of muscles than in dog No. 1, as compared with the opposite limb.

"Dogs No. 3 and 4 developed mange, and were killed at the end of the fifth month, lacking one week (145 days). The joints were all normal, as in specimen No. 2. A section of the bones was made; their structure presented no abnormity. (See Figs. 5 and 6, from one of the dogs; 7 and 10, glenoid fossa; 8 and 9, head of humerus.) In all of the joints the normal amount of synovial fluid was present and of proper consistence. This was evident by comparing it with that of the joints which had not been immobilized, as the dogs were allowed to run about on three legs. The muscles were very much atrophied. After the removal of dressing free motion of the joint was apparent, it being restricted only by the contracted muscle. The contraction was easily overcome by stretching, when motion was as perfect as in the opposite limb.

"Before beginning prolonged experiments upon animals, and especially dogs, they should be clipped and thoroughly scrubbed in a warm bath, with soap and a brush, then immersed in a solution of bichloride of mercury (1 to 200) for a short time; finally, the mercurial solution should be washed away with plenty of warm water. This process will not only remove filth, but will kill any vermin which, if left in the hair, would prove a source of annoyance to the animal and might defeat the object of the experiment. Bitches about two years old are preferable to dogs, as they are more easily kept clean; they are not so likely to wet the dressings as the dogs. They should be kept separate from all other animals and their apartments kept well lighted and ventilated.

"The bedding should receive careful attention and frequent changing.

CONCLUSIONS.

"The conclusions at which we arrive from these experiments are:

"1st. That a normal joint will not become ankylosed by simply immobilizing it for five months.

"2d. That motion is not necessary to preserve the normal histological character of a joint.

"3d. That when a healthy joint becomes ankylosed or its normal histological character changed, it is not due to prolonged rest, but to pathological causes.

"4th. That immobilizing a joint in such a manner as to produce and continue intra-articular pressure will result in destruction of the head of the bone and the socket against which is presses, as is evidenced by specimen No. 1, Figs. 2 and 3, in which there was present, the beginning of destructive changes.

"5th. That atrophy of the muscles of the limb will follow prolonged immobilization of a joint.

"If these experiments prove that prolonged fixation will not produce ankylosis of a normal joint, that motion is not essential for the preservation of its normal function, then the causes of ankylosis must depend upon pathological conditions and not upon prolonged fixation.

"It is claimed that motion in the treatment of inflamed joints prevents ankylosis. If this is a fact, why do the statistics of joints so treated show that ankylosis and deformity, to a greater or less extent, are by far the most frequent result? The statistics published by Shaffer and Lovett in the New York Medical Journal show in thirty-nine cases reported on in a series of many hundred:

Ankylosis	19
Slight motion	6
	25
Motion from 10° to 44°	7
Motion to right angle	3
Motion free	3

"The three with free motion were treated during the first stage of the disease. Two were under three years old. There were only two cases without shortening. The splint used was the long traction—one which admits of free motion at the hip-joint.

"To test this question still further, I sent a patient with knee-joint disease, which I had nearly cured, to a distinguished masseur for treatment by that method. I had perfectly fixed her joint for one year. The apparatus was removed and she had motion to about 35 degrees; no pain; could walk easily. She was attended daily by the masseur, and her leg was flexed and systematically moved and rubbed. After six months I found almost complete ankylosis. An examination made last week determined fibrous ankylosis and only a slight degree of motion. The "ossified"

man, so-called, paid a masseur to move his inflamed joints during two years of his early joint trouble. The result was perfect bony ankylosis of all the joints which were inflamed.

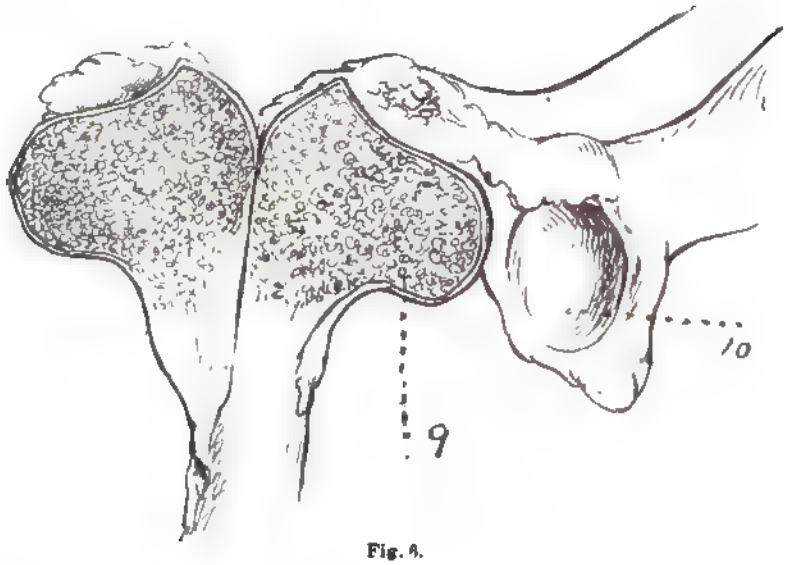


Fig. 6.

"The fakirs of India, after twenty years of penance, holding their limbs in one position, quickly regain the normal use of their joints after their religious frenzy has passed. (Thomas.)

Fig 7.

"I have several cases of children suffering from joint diseases which have been immobilized in a portable bed, ten, twelve and eighteen months, the joints of the lower extremities being kept perfectly quiet during the time. Recent examinations demonstrated that ankylosis had not taken place in the normal joints, and the inflamed joints are freely movable. I desire to place these cases on record, to stand by the side of those cases of ankylosis reported, supposed to be due to long rest of joint.

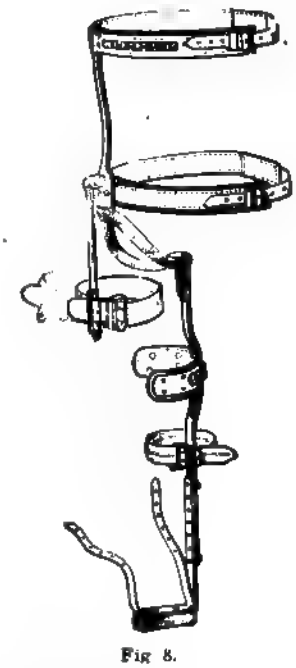


Fig 8.

Fig 9.

"In the treatment of wounds, inflamed organs and tissues, rest is one of the most important surgical laws. The surgeon protects

the wound from friction by means of proper dressings, and the ophthalmologist puts the inflamed iris at rest by the use of atropine and stay in a dark room. Since rest is a surgical law in the treatment of inflamed tissues in other parts of the body, and motion is not necessary for the normal preservation of a joint, or can in any way prevent ankylosis, why should many orthopædists still persist in treating inflamed joints by motion? The question of ankylosis is determined by the severity of the inflammation, the character of the inflammation, the duration of the inflammation, the presence of intra-articular pressure, the subsequent cicatricial contraction of soft parts around the joints, the tissues involved and the amount of destruction of bone and cartilage. Motion of an inflamed joint only interferes with repair, and more certainly hastens the case on to ankylosis and deformity. To prevent this calamity, when it is possible, absolute rest and the relief of intra-articular pressure should be the plan of treatment. Inflamed joints, treated upon the plan of absolute immobilization, and the relief of intra-articular pressure, furnished by far fewer cases of ankylosis, limited motion and deformity.

"The statistics from the Chambers Street Hospital of fifty consecutive cases of fracture at the elbow-joint, published by Dr. Charles A. Powers, show only one case of ankylosis. This is a better series of results than has hitherto been published. These patients were dressed with plaster-of-Paris and kept perfectly at rest for weeks, and no passive motion was allowed. This plan allowed the normal process of repair to take place without interruption. Motion could only have resulted in breaking up the new inflammatory tissue and endangering the future usefulness of the joints, either by bony ankylosis or cicatrical contractions of the soft parts.

"The question before us is, Why all of this experimental work? It is because the profession in years gone by have believed and are still taught that prolonged fixation of an inflamed or diseased joint will result in ankylosis. No greater error was ever taught, and, based upon this experimental work, I have devised appliances for the treatment of joint diseases, and more particularly hip-joint disease.

"The following paragraphs will convey a correct idea of the plan of treatment which we follow at the Post-Graduate School and Hospital. Ankylosis of the hip-joint, and angular deformities are now looked upon as curiosities in our clinic."

MECHANICAL TREATMENT OF HIP-JOINT DISEASE.

For many years the profession has been taught that the long traction splint used by Sayre, Taylor and others was the proper machine to use. The patient is allowed to walk upon this splint, using it as a perineal crutch, the splint stops at the trochanter and exerts no control over the joint, on that account it allows of motion to prevent ankylosis, which is erroneous. The patient, stepping upon this splint with the strap around the perineum, causes trauma of the joint while walking, and nearly every splint that I have seen adjusted allows the patient to put his toe upon the ground, which, of course, drives the head of the bone backward and forward into the joint, as Dr. Ridlon terms it, at the rate of 2,000 times an hour each day, as the child runs, and accounts for the disastrous results which we see published from institutions where this splint is used. Angular deformity, which produces shortening, nearly always results from the use of this plint.

This splint was devised at a time when it was believed that fixation would produce ankylosis of the joint and that motion was necessary to keep up the nutrition of the joint. It is needless to say that we have outgrown both of those ideas.

In the Post-Graduate Hospital we fix our cases of hip-joints from one to five years without motion, with the lateral traction fixation splint, and in our long series of cases, with or without great destruction of bone, and when we have had control of the patients they have recovered, practically, without angular deformity. Shortening is seen in this long series of cases only from non-development of the limb and extensive bone destruction. The accompanying cuts and description will convey a very accurate idea of the splint which we use in our treatment after the deformity has been overcome in bed. Tissues inflamed or diseased should be put at rest, to allow the normal process of repair to take place without the trauma of motion. This is the law. It is applied in the treatment of the iris, fractures, sprains and any other tissue that can be

immobilized. To carry out the requirements of this law in so far as possible, I was led to devise the splint illustrated in this article.

To fix the hip-joint, a splint must extend from the foot to the axilla. (See Figs. 7, 8, 9 and 10.)

Adhesive straps, extending to near the body from the ankle, furnish means of extension by tightly buckling them to the straps, the ring furnishing counter extension. The rod ending in the upper ring, prevents flexion and extension of the legs. The splint is intended to prevent every motion at the hip-joint and at the same time apply extension in a line with the neck of the femur, to overcome the spasmodic action of the adductors and abductors (see Figs. 7 and 8), which act on a line with the axis of the neck of the bone and not the shaft. Figs. 7 and 8 show the crutch and splint adjusted, the patient using crutches and standing upon a high shoe upon the well leg. This splint I found a little too expensive for dispensary work; I then constructed the splint (Figs. 9 and 10) which simply does away with the lateral extension joint and key. For my poor patients in the hospitals and dispensaries, I find these last named cheap splints, which apply the principle of fixation and traction in the line of the neck, almost perfection.

A glance at the cuts will convey the idea. Figs. 7, 8, 9 and 10 are the single and Fig. 11 the double splint for double hip disease. The splint is a bar of steel, extending from the foot to the axilla, accurately bent to fit the body; a tracing made on paper by laying the child on it will assist in shaping the bar. A pelvic belt, a thoracic belt, and a steel perineal ring complete the fixation part of the splint. The straps in the footpiece buckle to adhesive straps attached to the leg, which make longitudinal traction. The strap lashes the leg to the splint, making lateral traction precisely as the abduction bar acts in Figs. 7 and 8.

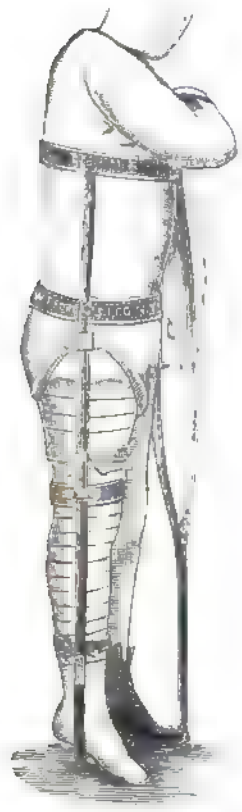


Fig. 10.

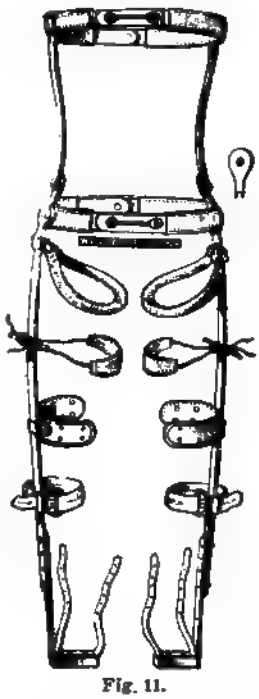


Fig. 11.

Fig. 12.

An ordinary blacksmith can construct this splint. Before these or any other splint is adjusted, however, the patient should be treated in bed until deformity is overcome and the active stage of the disease somewhat modified.

To conclude, my observations lead me to believe that the most serious element of destruction in hip-joint disease is the trauma

and pressure produced by the spasm of the muscles; that fixation of the joint without extension is an impossibility; that the successful treatment of the joint must depend upon its absolute immobilization, which can only be produced by proper extension and fixation; that the constitutional treatment of hip-joint disease amounts to but little, independent of mechanical treatment; that mechanics is everything; that extension in a line with the axis of the shaft and deformity alone, in hip-joint disease is entirely wrong; that extension

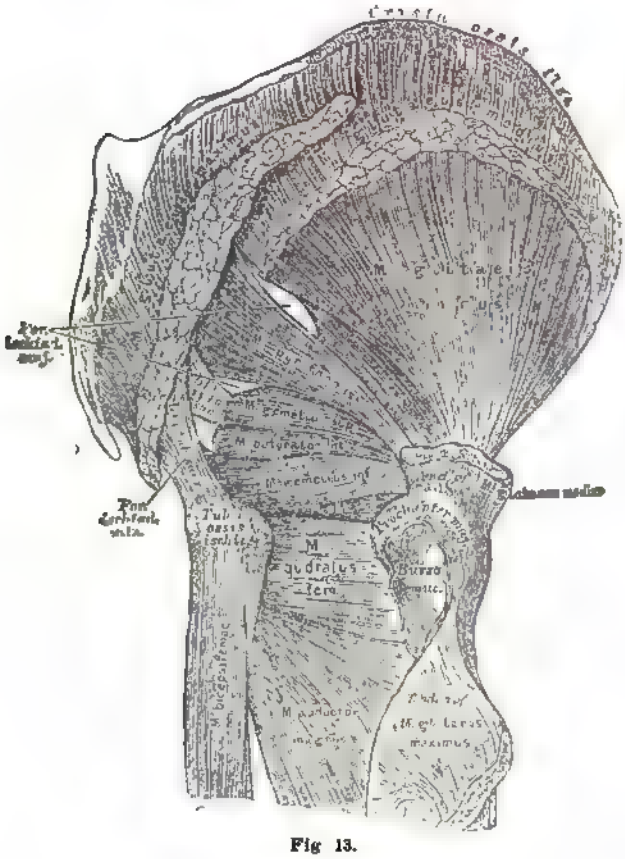


Fig 13.

should be made in a line parallel to the axis of the neck—in other words, two lines of extension—otherwise the idea of extension is not perfectly carried out; Fig. 12 conveys a correct idea of the direction in which the muscles act upon the hip-joint, that ankylosis of the joint is not produced by immobilization, but by the severity and character of the disease or inflammation; that the long traction hip-splints in general use neither properly extend nor immobolize the joint; that intra-articular pressure results in the destruction of the joint or ankylosis in a large percentage of cases is proved by statistics; that the results in hip-joint disease should be as good as those of knee-joint disease, and will be, provided perfect immobilization can be carried out; that patients should never be allowed to step upon any portative apparatus; that a high shoe on the well leg and crutches should be insisted upon until the patient is cured; finally, that the angular deformity seen in cured cases should not occur, and such cases are a standing rebuke to the splint and methods employed. In other words, no patient with hip-joint disease need ever recover with angular deformity. In exceptional neglected cases of dislocation a slight amount of deformity had better be left than resort to osteotomy.

OPERATIVE TREATMENT OF HIP-JOINT DISEASE.

The treatment of hip-joint disease is divided into the operative and mechanical. In all cases where abscesses are present they should be immediately evacuated. This enables the surgeon to intelligently explore the diseased joint with his finger, and ascertain to what extent the disease has progressed. If the head of the bone is separated from the neck it should be removed, together with the great trochanter and the neck. The acetabulum, if diseased, should be thoroughly curetted, together with any other diseased tissue that may be found in the joint, if all can be removed. If only small points of disease are found within the joint, those should be curetted, together with whatever diseased tissue exists within the joint, and the cavity washed out with bichloride solution 1 to 2000. The joints should now be filled with a solution of iodoform and glycerine, one-half ounce of iodoform to four of hot glycerine. After this has been done the patient should be put in bed, with extension in the line of deformity and lateral traction above the knee, amounting to about three pounds. Day by day the limb should be lowered, until the deformity is overcome. When the deformity is overcome the lateral traction fixation splint which I devised and use in the Post-Graduate Hospital should be adjusted, and the patient put on crutches with a high shoe on the well leg. Pus and tubercular material destroys living tissues by invading them, and when joints are allowed to macerate for weeks and months in these infectious materials, which now seem to be the favorite method of many of our orthopædic surgeons, extensive destruction of bone

will almost surely follow. In many cases extensive cutting of muscles, tendons and fascia may be necessary to overcome the deformity.

The reader will see, then, that we believe that deformities should be first overcome and all abscesses opened before the mechanical work begins. No case of hip-joint disease need recover with angular deformity, and to secure and attain this end steps should be taken at the commencement of treatment to place the limbs parallel, after which the lateral traction fixation splint, already alluded to, will prevent the patient from becoming again deformed. All abscesses, tuberculous or purulent, should be incised for the purposes of a careful exploration of the joint with the finger, for diagnostic purposes, and, secondly, for drainage. "An empty house is better than a bad tenant."

A METHOD OF PREVENTING SLOUGHING OF THE HEEL IN SYME'S AMPUTATION.*

By M. W. O'Brien, M. D., of Alexandria, Va.

Surgeon to W A and Mt V., Southern, and C and O. Railway Companies, Member I. A. R. S., Ass. Surg. So. Railway, Am Med Asso., etc

Gentlemen.—I desire to describe a method of doing "Syme's" amputation, in which are several practical points not clearly understood by many surgeons to whom I have spoken and not laid down in the text-books at all. The substance of this paper is from notes and descriptions given me by Dr. Dawbarn of New York, gathered while taking a course in operative surgery during the past winter. I will not waste time by referring to the frequency of injury to the foot and the necessity of amputation in whole or in part. Railway surgeons all over the country are seeing these injuries and doing these amputations every day. Cleanliness is being taught us and we are so familiar with its rules and application that pus is not now seen often by the up-to-date surgeon.

Syme begins at the external malleolus and goes to a similar point on the inside, making thereby the "stirrup" incision. Then the shortest line over the instep joins its upper ends. It is so commonly followed by sloughing that it has been said always to be so in a beginner's case. This has led to quite a number of modifications of the incision. For example I have given two of these.

Wyeth begins at the internal malleolus and goes under the sole to a similar point on the outside. This makes a heel flap much too long, hence he sacrifices on the instep, his upper cut arching an inch or so higher than Syme's. Wyeth's idea is to save by long heel flaps a good many branches of the external plantar artery that Syme sacrifices. In Ashhurst's "Encyclopædia of Surgery" the other

M. W. O'BRIEN, M. D.

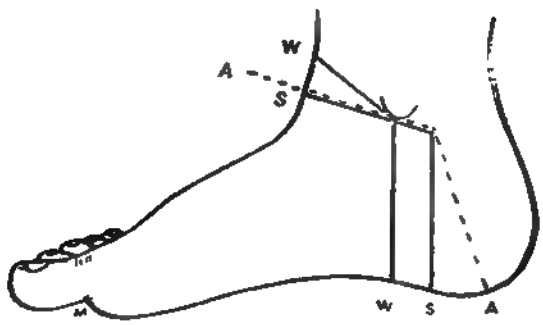
idea is given. It is just the reverse of Wyeth's, and runs like Syme's, except that it goes even further back toward the heel, indeed running parallel with the rear border of the heel always. McBurney also prefers this; he says it is admitted that Wyeth saves more of the external plantar branches than does he, but they are not needed, because of the internal calcanean arterial branches coming from the posterior tibial arteries, which would give enough of a supply. That what leads to sloughing in Syme's operation is "hashing of the heel flap," due to numerous incisions of it while shelling it off the os calcis at the point where it (the bone) is subcutaneous, and, McBurney adds, the more this heel flap is made a saucer rather than a deep cup to

* Read by title at the eleventh annual meeting I A R S., Toronto, 1889.

shell off of the bone, the easier it is to do it without many cuts or "hashing." Under anyone's incision there is always in this amputation an excessive flap; really more than is needed.

Now, the points that Dr. Dawbarn insists upon are as follows:

1st. Make anybody's incision. It is not

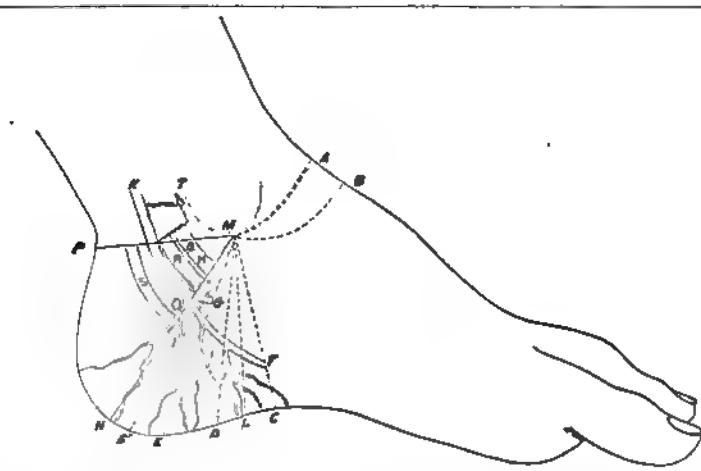


SHOWING LINES FOR INCISIONS.
A—Ashhurst. S—Syme. W—Wyeth.

material, because if the heel bone be shelled out of its cup or saucer by his (Dr. D.'s) technique, there can never be sloughing, since there is not even a capillary sacrificed and the knife is not used at all in the dangerous (subcutaneous) region. Dissect in the usual way after opening the ankle-joint, until, with the foot (toes) sharply depressed to open widely the wound, you come at the back to the point where the tendo Achilles begins to be inserted. From this point down to the region beneath the os calcis, which bears the weight, is the region of danger from sloughing, and here the heel is braced against the foot of the table, the leg steadied by an attendant's weight upon it, and aided, if need be, by a periosteal elevator, in not more than ten seconds the os calcis is peeled out of the flap at this dangerous point. When the under surface of the sole is reached no further need of continuing sub-periosteal work exists, for here is a thick pad of fat.

2d. In rounding off the edges of the sawn tibia-fibula, use a large flat file. It is simply a saw of another shape, doing no more damage than any other saw. If boiled it is, of course, aseptic, and it avoids the crushing of the cancellous tissue which the use of the cutting bone forceps for this purpose causes.

3d. It is strange that the text-books neglect to call attention to the great likelihood that if the posterior tibial nerve with its branches, the plantar nerves, be not dissected out and cut away (for an inch or so at least of the posterior tibial nerves), the patient may have to walk on the nerve, with consequent great suffering. I have repeatedly seen such cases. If, as is natural, the nerve be drawn toward the thickest part of the scar-tissue following the amputation, such walking upon it is inevitable. To shorten it up (always the final step before sewing the flap edges together) have an assistant turn inside out the cup "of heel flap," out of which the heel has been removed. The nerve will now be seen upon the inner side of the stump and about



FROM WYETH—DIAGRAM SHOWING THE ARTERIAL SUPPLY TO THE CALCANEAN REGION ON THE TIBIAL SIDE.

M—Internal malleolus.
P C M N—Tibio-tarsal region.
K—Posterior tibial dividing at O into (G) internal and (F) external plantar branches.
I I I—Calcanean branch of external plantar.
I—Articular branch from post-tibial.
H Articular branch from internal plantar.
Q—Tib. post. tendon.
R—Flex. long dig. tendon.
S—Flex. long. poll. tendon.
MA, MB Anterior incision.
ML, MD, ME, ME'—Lines showing that the nearer the incision approaches the heel the more danger there is of cutting off the principal blood supply to the calcanean flap.

the caliber of a slate pencil. It must be dissected out with care, because underneath it lies the posterior tibial arteries, branches and veins. The nerve covers these and they are only clearly seen after it is cut away with its continuation, the plantar nerves.

4th. My custom is as follows: To choose between Syme and Pirogof (the operation in which the os calcis is sawed across just behind the point where it articulates with the astragulus, and this sawn remainder is brought against the sawn tibia and fibula): If the trouble, grave enough to demand an amputation so far back as this, be an acute injury, such as a railroad smash-up, then I perfer a Pirogof, granted the os calcis be not infected with grime and filth ground into the cancellous tissue; provided, in a word, that is, that one can have asepsis.

But if one has to deal instead with chronic disease of the tarsus, demanding such a grave amputation, then I advise a Syme, because it would hardly be safe to leave a part of an os calcis that might be in an incipient state of tubercular disease, or of malignancy, like its fellows of the tarsus.

Conservative Surgery of the Fingers.

By W. L. Hunt M. D.

In finger amputation the joint of election is usually decided by desire to obtain the must useful stump, while the cosmetic effect is a minor consideration, but still one prominent in the operator's mind.

There is in actual practice a divergence in opinion, as to whether the amputations should be through the joints of the phalanges or through the shaft of the bone.

Gross, in the edition of 1872, says, "desirable to save as much of the member as possible, both on account of utility and seemliness."

He mentions mostly amputations by disarticulation, saying but little about amputation through the shaft.

Ashhurst, in the edition of 1881, takes this sound and proper ground, viz.: "It should be the surgeon's aim to save every portion that can possibly be preserved. The only possible exception to this rule is in the proximal (nearest the body) phalanges of the middle and ring fingers. As there is no special flexor tendon for these fingers, they are apt, if preserved, to project stiffly, and to rather hinder than assist the usefulness of the rest.

Hence, when in these fingers it becomes necessary to remove all but the proximal phalanx it is best to also remove this at the phalango-metacarpal junction."

Treves' "Operative Surgery" says: "Remove as little of the digit as possible, a hand with nothing left but the stump of a thumb and little finger is more useful than the most elaborate artificial limb."

He quotes from Jacobson's "Operations in Surgery," as follows:

"The flexor tendons should be stitched to the periosteum or into the flaps, and after the risk of stiffness has been explained, the more care is taken to fix the flexors to the theca, the more quickly it heals, and the younger the patient the greater will be the movement gained."

Treves says himself: "Amputation of the second phalanx should be done through the bone if possible that, 'if disarticulation' is effected the first phalanx is apt to be stiff, and may be a nuisance, which may sometimes be avoided by including the flexor tendons in the sutures."

Roswell Park says: "Save all parts of a finger except the proximal phalanges of the middle and ring fingers, which usually remain stiff and extended, and in the way when the other fingers are present. Save these, however, when the other fingers are gone."

In a case of a fisherman who came to the hospital in Bangor for amputation of the third finger, because of tuberculosis of the first phalangeal articulation, I used a method not mentioned elsewhere and one which merits consideration. The skin flaps were antero-posterior, not including the tendons in raised flaps, but dissecting them out of sufficient length to sew together the flexor and extensor tendons over the sawn bone. The periosteum having been pushed up the bone as a cuff, and brought over the stump.

Curious to see if this could fail to allow flexion and extension, the patient carried a line to his physician, who writes:

"The original dressing was removed after twelve days. Found the tissues healed and in excellent condition. At the second dressing I found that the stump would extent and flex as easily and completely as the other fingers. I consider the result one of the most successful in its class."—Jour. Med. and Science.

If you expect to get much shock from an operation, remember that here again prevention is better than cure. Use a little morphine before operating to quiet the nervous system, keep the patient very warm before and during the operation, as well as beforehand. Small doses of strychnine before the operation are also indicated.—Int. J. Surg.

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JAMES SYME.

James Syme, the distinguished inventor of the operation bearing his name, was the second son of John Syme of Cartmore and Lochore, in Fifeshire, and was born in Edinburgh on November 7, 1799.

Syme early showed a liking for anatomical and chemical studies and at the early age of seventeen discovered the method of rendering fabrics waterproof by coating them with a solution of caoutchouc. The method was afterward patented by Mackintosh, after whom our storm coats of to-day are named.

In 1815 he went to Edinburgh and entered as a pupil under John Barclay, the celebrated anatomist, and three years later he was put in charge of the dissecting room. He spent some time in study in Paris and Germany, and in 1833 was appointed professor of clinical surgery in Edinburgh. The following year, by the removal of Robert Liston to London, Syme was left without a peer in Scotland and was fairly entered on his brilliant career.

In a highly appreciative notice of Syme and his works, Mr. Oliver Pemberton, in the Bradshaw Lecture, states:

"It may be truly affirmed that the period covered by Syme's commencement of practice and the resignation of his chair comprehended a period in the advancement of the science and practice of surgery—a space of fifty years unequaled in the history of the profession. To the last his mind was open to the adoption of additional means of simplifying the practice of surgery, and, so long as these did not clash with those principles of thought and

JAMES SYME.

action which forever guided him in his calling, he would readily become the stanchest advocate of change."*

As early as 1828 Syme, though not at that time connected with any hospital, excised the elbow-joint for the first time in Great Britain. In 1838 he received a mark of royal esteem by being appointed surgeon-in-ordinary to the queen in Scotland. At one time he removed to London on alluring offers being held out to him, but was dissatisfied with the prospects there and returned to Edinburgh, where he died from the effects of hemiplegia on June 26, 1870. The world renowned Lord Lister is his son-in-law.

The disarticulation through the tibio-tarsal

*London Lancet, 1894, II, page 1399.

joint, with which Syme's name is connected, had been somewhat frequently performed before on the continent, especially by Velpeau and Baudens. However, their flaps being taken from the dorsum of the foot and from the skin above the heel, resulted in the pressure from locomotion being brought to bear on the cicatrix. It remained for Syme to introduce the operation into Great Britain and perfect it, and on September 8, 1842, the new feature was adopted of using the pad of the heel for covering the stump. Besides this method of operating, Syme was the first to excise the superior maxilla, to disarticulate the clavicle, and to perform subcutaneous tenotomy of the sterno-cleido-mastoid for wry neck. He will also be remembered for his operation on gluteal aneurism, and for his advocacy of excision of the elbow in the face of violent opposition.

"As a practical surgeon," says one of his biographers, "Syme presented a remarkable combination of qualities, soundness of pathological knowledge, skill in diagnosis, rapidity and clearness of judgment, fertility in resource as an operator, combined with simplicity of method, skill and celerity of execution, fearless courage and singleness of purpose."

Translations.

Tibio-tarsal Amputation Without Hæmostasis.

By Dr. Leon Desguin.

(Translated for The Railway Surgeon.)

I would not burden you with remarks on a tibio-tarsal disarticulation if there was not some feature about it worthy of interest. The only point I wish to call your attention to is the fact that no hæmostasis was used (I mean definitive hæmostasis, for the Esmarch constrictor was applied as usual). The history of the patient is not of much importance, but I will give a few details to show the state of the circulation in the amputated foot.

The patient was a woman of twenty-six, the mother of a family and of good general appearance, though manifesting some signs of pulmonary tuberculosis. She had suffered for a long time from some affection of her foot and entered the hospital in September of this year. There was a fistula which was discharging but slightly, but radiography left no doubt as to the presence of advanced tuberculous lesions in the tarsus; the pain was very intense. As the general aspect of the foot did not correspond to such grave lesions, I tried palliative measures at first, mercurial ointment, compression, chloride of zinc, deep ignipuncture. None of these were of any use, so I performed Syme's operation on October 29 last.

At the time of operation there was but little deformity of the foot; the soft parts were but slightly swollen, and the skin, fine and elastic, had its normal color. The veins were scarcely apparent. There was no fever, the general circulation was normal and the pulse presented no peculiarity.

The operation was performed after applying an Esmarch contrictor. The diseased calcaneum was entirely removed with the foot. The tibial surface and malleoli were sawn off on a level. The old fistula, which was located in the posterior flap, was curetted and a drain placed in it. Without looking for any vessels the wound was sutured and dressed. The constrictor was now removed and the patient replaced in bed with the limb elevated on cushions. The after course was absolutely normal; there was no hæmorrhage and only the ordinary amount of oozing.

Please understand, gentlemen, I do not propose to abolish hæmostasis in amputations. In showing that tying the vessels may be dispensed with under certain conditions, I wish simply to prove that we should not consider a vessel by its name and its anatomical location, but rather by a series of other conditions, the state of its walls, the blood pressure, the circulation, activity of the part to be operated on. We have seen utero-ovarian arteries which did not need to be tied, while vaginal arterioles without a name gave rise to severe hæmorrhage.—(Ann. de la Soc. Belge de Chirurgie, Dec. 15, 1898.)

Red Cross Medal.

The Red Cross Medal has been founded by the Empress Victoria Augusta, lady patroness of the German Red Cross societies. The medal, of which there are to be three classes—bronze, silver and gold—is to be bestowed on persons of both sexes, without distinction in rank or position in life, for special services rendered to the Red Cross cause.—Brit. Med. J.

Extracts and Abstracts.

Amputations Through the Foot.

By J. Hall Brewster, M. D., of Elmira, N. Y.

In selecting a subject for discussion at this meeting I have aimed to choose one which would be of interest to the general surgeon.

In injuries to the foot which require amputation we have certain rules, well established and taught in all medical colleges and modern text-books. The classical amputations of Lisfranc, Hey, Forbes, Chopart, Pirogoff and Syme are carefully described and the surgeon is expected to remember and follow out these rules. Let us review hurriedly these operations. The one important point in amputations of the toes is to have a long plantar flap so as to bring the cicatrix on top and away from pressure, and this holds good in amputations through the tarsal and metatarsal bones. I wish to advocate saving all the tissue possible in operations upon the foot, as every inch saved is of the greatest advantage to the patient.

When an amputation is necessary for a lesion near the articulation between the first and second phalanges, in which only the anterior extremity of the first phalanx is involved, section through the bone should be preferred to disarticulation at the metatarso-phalangeal point, provided the line of section is through the anterior third of the phalanx.

When the loss of tissue requires an amputation behind the metatarso-phalangeal articulation, section of one or even all of the metatarsal bones should be effected rather than unnecessarily sacrifice any portion of the foot by disarticulation at the tarso-metatarsal joint. The line of section should always be as near the anterior extremity as possible, and when it falls within three-fourths of an inch of the tarso-metatarsal joint, a disarticulation should be made at that point.

Disarticulation at the tarso-metatarsal joint, or the operation of Lisfranc, is performed when loss of tissue requires that all the metatarsal bones be removed. When this operation is necessary, I think it has few disadvantages.

Hey's operation is the same, except that he saws off the projecting end of the internal cuneiform bone. In so doing there is a useless loss of tissue, besides severing the attachment of the tibialis anticus muscle, which leaves the action of the muscles of the calf practically unapposed and allows elevation of the heel. I think this should be done only when the anterior part of the internal cuneiform bone is injured beyond any hope of recovery. If a greater part of this bone be injured, it may be removed entirely by disarticulation from the scaphoid and middle cuneiform, leaving the external and middle cuneiform bones in position. If the middle and external cuneiform bones be involved anterior to their middle line, the injured part should be removed by saw or curette instead of doing Forbe's operation, which is a disarticulation from the scaphoid and section through the cuboid on this line. Chopart's operation is disarticulation between the scaphoid and cuboid and the astragalus and os calcis. This operation may be modified by sawing off the anterior parts of the astragalus and calcaneum.

If after any of these operations the heel is elevated division of the tendo-achillis may be done later.

And now we come to the favorite of them all—Syme's amputation at the ankle-joint. This operation is performed by making an incision from the center of the internal malleolus directly across the sole of the foot to a point one-fourth of an inch anterior to the external malleolus. The extremities of this incision are joined by one arching upward across the front of the ankle. The foot is strongly extended and the joint opened anteriorly by dividing, first, the anterior ligament and then the lateral ligaments. The soft parts are dissected from the bone, until the posterior part of the os calcis can be brought through the opening and the dissection carried along the under surface of this bone until the foot is removed. Next the flaps are lifted from the tibia and fibula until a section can be made at the anterior margin of the articular surface of the tibia. It is important in this operation that the plantar flap extend forward far enough so that the blood supply is not endangered and that in dissecting out the bones the knife edge be kept always close to the bones, otherwise the vessels are apt to be injured and the life of the stump put in danger.

The osteoplastic operations of Pirogoff and Le Fort are performed as follows. In Pirogoff's operation the same incisions are made as in Syme's operation. The ankle-joint is opened anteriorly by dividing the anterior and lateral ligaments and the anterior upper surface of the os calcis brought forward through the articulation. The next step is to saw through the os calcis, leaving the posterior part undisturbed. The articular ends of the tibia and fibula are now divided so that all the articular cartilage is removed, the angle formed by these two lines of section being about 90 degrees. The sawn surface of the os calcis is now brought in apposition to the sawn surface of the tibia and fibula, and the wound closed.

Le Fort's method is as follows: Three-fourths of an inch below the external malleo-

lus, commence an incision which is carried directly forward to within half an inch of the calcaneo-cuboid articulation. From this point describe a curve with an anterior convexity over the dorsum of the foot following the line of the astragalo-scaphoid joint until the inner border of the foot is reached, where it is carried backward and ended at a point one inch in front of the internal malleolus. Cut a plantar flap, also having a forward convexity joining the anterior limit of the straight incision on each side of the foot. Dissect up the dorsal flap until the tibio-tarsal point is exposed. Disarticulate the astragalus from the os calcis by entering a knife between the bones from the outer side, dividing the ligaments as far as possible. Remove the front of the foot at the medio-tarsal joint, after which the completion of the disarticulation of the astragalus is easily accomplished. Saw off the upper surface of the os calcis just below its articular surface. The tibia and fibula are next sawn through just above the articular surface of the tibia, as in Syme's operation. The two sawn surfaces of bones are brought together and the wound closed.

Before leaving these operations, I wish to mention the calcaneo-astragaloid disarticulation as performed by Malgaigne. This operation is done when, in an amputation through the foot, it is found that the os calcis must be removed. Divide the skin and tendo-achillis just at the level of the upper surface of the os calcis, carrying the incision forward and downward under the external malleolus and forward to the tuberosity of the fifth metatarsal bone, then curved across the dorsum of the foot, crossing the inner side over the anterior edge of the scaphoid, thence straight down and under the foot to a point half an inch beyond the center of the sole. From this point an incision is made directly back to the point of beginning. Carefully dissect the plantar flap from the bone, leaving nothing but the periosteum, until the calcaneo-astragaloid articulation is well exposed. Remove the anterior part of the foot at the astragalo-scaphoid articulation. Seize the os calcis with a strong pair of forceps and complete its removal. After this operation the cicatrix will fall upon the dorsal and external lateral aspects of the stump.

To sum up in a few words, the terminal phalanges of all the toes should be removed by disarticulation when it is found necessary to remove a portion of the entire thickness of these bones; the same applies to all of the second phalanges, except that of the great toe. The proximal phalanges of all the toes should be sawn through if the line of section is anterior to their middle. Posterior to this, disarticulation should be effected.

The metatarsal bones should be sawn through in preference to disarticulation, when three-fourths of an inch of the bone can be saved. Hey's operation should not be done except when the anterior portion of the internal cuneiform bone is diseased or injured. One-fourth of each cuneiform bone and one-half of the cuboid should be sawn off in preference to the sacrifice of tissue necessary to do Forbe's or Chopart's operation.

When we find that the cuneiform bones must be removed and the posterior part of the cuboid is not injured, Forbe's operation should be done.

As we proceed toward the heel the next operation is that of Chopart, which should be done when the scaphoid is involved.

The subastragaloid operation or that of Pirogoff or Le Fort should be performed, when the condition of the soft parts will permit, in preference to that of Syme's, thereby avoiding about two inches of shortening.

As I said before, Syme's operation seems to be the favorite, and I think this is done a great many times when one of the others could be substituted and the patient greatly benefited. If the astragalus can be left in position the motion of the ankle-joint is retained, which adds greatly to the ease and comfort of locomotion.

All of these operations and rules are very well to remember, and I suppose every surgeon should be thoroughly familiar with them. They look well in the text-books and sound well in a lecture, besides being exceedingly good material for examination day; but the all-important question in amputations through the foot is, "How much can be saved?" In my opinion no tissue or bony framework is to be sacrificed for the purpose of doing somebody or other's operation. Find out how much tissue is destroyed or injured beyond hope of recovery and amputate just above it, whether it be an articulation or not, and I think just as good results will be obtained.

Always give the patient the benefit of the doubt if a question arises as to where to amputate, even at the risk of a secondary operation. With careful antiseptic precautions, tissues which seem almost entirely destroyed may recover.

In presenting this paper it is not my purpose to impart information, but to bring out a discussion which, I hope, will be of interest and benefit to all of us.—Lehigh Valley Med. Mag.

When the profession recognizes peritonitis not as the disease, but only as a symptom, then, and only then, will the mortality of the disease be where it should be. It is far better to make exploratory incisions than to assume the risks of delay.—Brokaw.

The Treatment of Sprains of the Ankle with the Gibney Bandage.

By. J. Howe Adams, M. D.

Undoubtedly the commonest and most troublesome sprain encountered by the physician in his daily work is that occurring at the ankle-joint. The results of treatment of this accident have proved so unsatisfactory that the expression "a sprain is worse than a break" has become almost a proverb. Many practitioners dread the occurrence of these cases in their practice, even when they have religiously carried out the treatment laid down in the text-books. This is unfortunate, for by the results obtained in minor surgery frequently is the doctor judged, and if he can bring about good and speedy results in this well-known condition it frequently increases his popularity far more than a brilliant diagnosis of some obscure affection which the laity are never able to comprehend. Having been successful in the use of the so-called Gibney treatment of sprains, I beg leave to report my results. In conversation with many physicians from different parts of the country, I find that the treatment is not as well known as its efficacy would warrant; this has emboldened me to publish my experiences.

According to the standard authorities, there are three indications to be fulfilled in the treatment of sprains: first, to control inflammation; second, to secure the absorption of the exudation; third, to restore the function of the joint. The violent wrenching or twisting which the joint experiences strains or tears some of the ligamentous fibers of the articulation and the blood vessels of the synovial membrane, and in severe cases even the membrane itself is ruptured. In addition to these lesions, the tendons and their sheaths on the periphery of the articulation are frequently involved in the injury. This condition of affairs is a sufficient explanation of the symptoms which we find and are called upon to treat. They occur generally in ginglymoid joints, as the ankle, the knee and the wrist. There is no provision for lateral movements in this class of joints; consequently when an ankle is violently abducted, adducted, or twisted, the force is concentrated on the lateral ligaments, causing them to give way to a greater or less extent. In a ball and socket joint a sprain is a rarity; the movements must be carried to a great degree to produce such results.

The classic treatment of a sprained ankle is to elevate the limb and apply lead-water and laudanum or the use of heat in some form, depending largely for guidance on the sensations of the patient. The heat and moisture are supposed to favor transudation and also to mollify and soften the tissues, thereby unloading the engorged vessels and taking the pressure off the tissue. Twenty-four or thirty-six hours were consumed in this treatment, waiting for the culmination of the congestive or inflammatory stage of the sprain. Then to favor the removal of the transudation which caused the swelling, stimulating or astringent applications were used, conjoined with pressure. A piece of old linen or flannel, after being moistened with soap liniment, dilute alcohol, arnica, or a solution of salt in vinegar, was laid over the joint and covered in with the turns of a roller bandage applied with sufficient firmness but so as to cause no pain or uneasiness; or a plaster or starch bandage was applied, which was kept on for five or six days. During this treatment the joint was kept completely at rest. Then movements were cautiously begun to restore the motion of the joint.

Despite the most rigid observance of this routine the results were too frequently bad; the soft parts remained swollen and indurated; the movements were stiff and painful. Hence the after-treatment often combined the use of blisters, massage, continued soakings in hot water, etc. Sometimes the pain attending these injuries resembles rheumatism, and being frequently aggravated by atmospheric changes does partake of the nature of this affection.

Dr. V. P. Gibney of New York, fully realizing the ineffcacy of this treatment, a number of years ago had his attention called to a volume published by an English writer, Mr. Edward Cottrell; in this work—"Some Common Injuries to Limbs"—was laid down a course of treatment radically different from the one in vogue. Dr. Gibney tried the plan and met with such success that he published his result in the New York Polyclinic, 1893, vol. i, pages 3-6. Although the treatment was not original with Dr. Gibney, who gives credit to the source from which he obtained it, it has generally been known by his name.

Dr. Gibney's explanation of the treatment is not very clear; I doubt if the average reader could apply his bandage from the description given. I will try to clarify his instructions.

The plan is simplicity itself. It consists in applying a tight bandage, composed of adhesive plaster, to the ankle and lower portion of the leg, immediately on the reception of the injury, paying no attention to the use of rest or elevation—at least not after the first twenty-four hours. The results obtained by this simple treatment seem out of proportion to the attention paid to the sprain; but certainly the clinical history of these cases is remarkably good. As a rule the patient is able to walk with comparative comfort immediately after the application of the bandage;

he experiences no especial discomfort, and in a few days he is practically well. The most marked thing about the treatment is the surprise of the patient at his progress; he is, of course, familiar with the progress of other cases, and it seems impossible for him to get over his astonishment before he is lost sight of by his attendant.

The details of the application of this bandage are as follows: Ordinary adhesive plaster is cut into strips one-half inch wide and in two lengths, about twelve and eighteen inches long. Taking up the foot as soon as the patient is seen and the diagnosis is made, one of the longer strips is placed around the ankle, parallel to the sole of the foot, beginning in front of the big toe, carrying the strip around the ankle just above the contour of the sole, and bringing the end back across the top of the foot to about the point where the strip began. It is well to place, overlapping this initial strip, a parallel piece. In placing these strips on, care should be taken to draw them as tightly as possible, so that the bandage will fit snugly when finished. Having applied these strips, another strip should be placed at right angles to them, which makes it run parallel to the back of the leg. One of the shorter strips should be selected for this purpose. Beginning well behind and above the ankle this strip should be carried down around the sole of the foot and brought up on the other side of the leg, making, as it were, a stirrup for the foot. The same precaution of applying the strip as closely as possible should be observed. Now the strips should be applied alternately, first one around the ankle parallel to the sole, then one parallel to the back of the leg, each one overlapping the one previously applied, running in the same direction, to some extent. This procedure should be kept up until the entire foot is inclosed in a boot of adhesive plaster, having the appearance of a shoe in which part of the heel has been cut away. This dressing, properly applied, has a very neat appearance; over it can now be placed an ordinary roller bandage, which will serve to help the adhesive plaster to "take hold." The patient should now be cautioned to be careful for a day or two, when he can begin to move around rather freely. This dressing can be kept on until the pain and swelling have subsided, when it can be removed, and no especial further treatment is indicated. If the dressing becomes loose, it can be reënforced by additional strips placed over the loose ones.

The history of a typical case is as instructive of the treatment as a description of the dressing. The following is characteristic of many others: A tennis player fell while playing on a court and sprained his ankle. He was a heavy man and the sprain was so severe that he was unable to put his foot on the ground, while walking on it was simply out of the question. Adhesive strips were at once applied, and after much coaxing the patient placed his injured foot on the ground tenderly; to his surprise he found that he could walk, not rapidly nor well, but still he could bear his weight on the limb and get over the ground to his home without assistance. He remained quietly in the house for the rest of the day.

This accident took place on Friday. On Saturday and Sunday he went around to some extent. On Monday he walked to my office without trouble; he had felt no especial discomfort and he could walk fairly well. In a week's time he was almost as well as before the accident. To say that he was astonished is putting it mildly; he was able to judge of the efficacy of the treatment, and it made him enthusiastic over its results.

This is the history of Dr. Gibney's patients. I noticed on reading over his original paper how he emphasizes the surprise of his patients when once encased in their bandages. Certainly this treatment constitutes a distinct advance in minor surgery.—Med. Age.

On Head Injuries and Their Treatment.

The vicissitudes of the trephine constitute one of the most interesting chapters in surgical history. From the days of Bérenger de Carpi and his contemporary, Ambroise Paré, down to our own—a period of over three centuries—the cranium and its contents have offered a most attractive field to the surgeon. The secret of this attractiveness lies in the startling eccentricity, of course, pursued by pathological processes within the cranium, especially of those of traumatic origin. Even the earliest observers of experience were cognizant of the tendency in cases of the latter sort, of least apparent moment, to terminate fatally, while the most severe often recovered spontaneously under unfavorable circumstances. The discovery of this treachery on the part of diseased nervous tissue has been an incessant source of irritation to the surgeon, keeping him constantly on the qui vive in the effort to outwit nature by strategic operations. How one-sided the struggle has thus far been is painfully obvious to one who has the opportunity for examination of its unpublished records.

It is interesting, in the light of present pathological knowledge, to look back upon the fierce contentions which went on among the surgeons as to the danger of converting (by operation) a simple into a compound fracture, when we consider that the cranial opening stands in about the same relation to the real problem as does the skin incision in an ab-

dominal operation. It is curious to note, moreover, that there are still surgeons who have not grasped the distinction between depression and compression, and hence have not eradicated from their minds the false idea that the immediate elevation of a depressed fragment of bone is a matter of absolutely vital importance.

Although we cannot but admire the improvement which has taken place in the technique of cranial surgery, yet we cannot help feeling that the very facility of the operation of trephination often leads the surgeon into ill-considered action, and betrays the consulting neurologist into counseling operative interference from which his calmer judgment would dissuade. The difficulty of exact diagnosis, even with our present knowledge, is still great, and the neurologist must often admit in the presence of a given case of cranio-cerebral traumatism that he is confronted by a combination of circumstances so unique that he occupies very much the same position as does the weather prognosticator in the times when "all signs fail." There is no case like a head case to dispel fondly cherished delusions as to the significance of symptoms; no case like a head case to engender regrets. There is no opportunity to study leisurely the steady invasion of a pathological process, such as a cerebral neoplasm; there is need, and urgent need, for the keenest diagnostic skill, for the most comprehensive judgment, and often for self-restraint. Historical data are most commonly totally insufficient and untrustworthy, and the neurologist is immediately plunged in medias res. Under the stress of circumstances, it is easy for the cerebral aspects of the cast to dominate the clinical picture and for a fractured liver, spleen or kidney to fall short of consciousness. On the strength of a dilated pupil, a mono or hemiplegia, the skull is opened and the lesion sought, and if not found at the site of operation, the latter is enlarged, or a counter opening made on the opposite side of the head—in an unfortunate majority of cases, all to no purpose.

The present occasion seems a fitting one to raise the question as to the propriety of such a course of action. We should ask ourselves exactly what we expect to accomplish in a field of operation as limited, and under physical conditions as difficult as these presented in trauma to the soft and yielding cerebral substance. If it were always a question of the relief of compression from uncomplicated extradural hæmorrhage, the propriety of such operation would be unquestioned, but unfortunately the facts of statistical evidence are overwhelmingly conclusive as to the very regrettable rarity of such a desirable condition of affairs. Autopsy after autopsy continues to reveal the undeniable truth that the great majority of traumatic head cases present multiple lesions, a most natural revelation in view of the necessarily diffuse transmission of a traumatizing force. In this connection we need but refer to the frequent association of small hæmorrhages in or about the motor areas with abundant hæmorrhage, and areas of laceration or contusion in the so-called silent regions of the brain. How easy it is for the former to evoke the predominant clinical phenomena in a given case needs only to be mentioned to be appreciated. Moreover, if the latter had no significance, the problem would be reduced to its lowest terms, but, alas! physiological experiment has demonstrated only too conclusively how little hæmorrhage is necessary in the cerebellar chamber (for instance) to produce a quickly fatal result, owing to the pressure discontinuity between this and the other chambers of the brain.

In the face of all this it seems to us that the limitations of the utility of trephination in cranio-cerebral traumatisms are clearly defined. First of all, experience teaches that the fundamental rule governing such cases is not to operate at all until some reaction from the shock of the trauma has taken place. The second rule should be to operate only upon depressed fractures and upon cases which present a reasonable probability of middle meningeal or intra-cranial hæmorrhage, so situated that by the evacuation of the clot dangerous pressure can be removed from the brain. It is in these cases that cerebral surgery furnishes brilliant and life-saving results.

The removal of shattered fragments in compound fractures, and the free drainage of lacerated areas, and the cleansing and drainage of septic conditions of traumatic origin, also afford very evident indications for opening the cranium.

Although to the enthusiastic advocate of trephining the above limitations may seem too narrow, he may be legitimately asked to report any cases which he can safely say were saved by his operation where the conditions were other than those enumerated.

We have already referred to the danger of laying too much stress upon a mono or hæmiplegia in head cases as localing guides, and we would here urge that too much significance should not be attached to the condition of the pupils, for their variability under identical circumstances is extreme.

The "interval of consciousness" and, where present, the slow pulse of cerebral pressure, afford the best signs for our guidance in deciding upon an operation after cerebral traumatism.

In doubtful cases, suggesting hæmorrhage, where, owing to alcoholism or the immediate onset of the bleeding, the immediate unconsciousness following the traumatism passes over into the deeper coma, with slow pulse

and paralysis from cerebral pressure, and the symptoms grow progressively worse, trephining is again urgently indicated.

Viewing the whole subject broadly, we should conclude, in the light of statistical evidence, that the results thus far obtained from trephination, even with the most improved technique, are, except in cases which embody the conditions set forth in our limitations, distinctly discouraging; and we venture to predict that if the surgeon would only more fully acquaint himself with the exact nature of the pathology of cerebral traumatisms and with the laws of brain physiology, the indications afforded by a dilated pupil or a hæmiplega would not seem so urgent, and the facility of trephination would not so often lead to its abuse.—Boston M. and S. J.

Sponge Grafting.

By P. H. Salter, M. D., L. R. C. P. & S. Ed., Norfolk, Neb.

We are indebted to Dr. Hamilton of Aberdeen, Scotland, for the introduction of sponges to assist normal granulating surfaces to more hurried and complete repair. He used them to promote healing in chronic ulcers, but I with to draw your attention to their use in aiding the filling in of cavities, both in soft tissues and in bone, which have been left from either disease or injury. I had seen sponges used to aid in filling up cavities in soft tissues in the Royal Infirmary of Edinburgh in 1884 and 1885, but have never heard of their use for the same purpose in cavities in bone. Having used it several times successfuly in soft tissues, I was led to try how it would act in bone. My experience in the few cases in which I have had the opportunity of using it have more than met my expectations.

A sponge placed in a cavity acts as a mechanical support to the new tissues being formed, particularly the new capillary loops. Its meshes are gradually filled in by granulating tissue, and as this grows the sponge is slowly absorbed. To attain success we must remove all necrotic tissue and get the wound in a perfectly aseptic condition. In bone it is necessary to remove every particle of carious material. We may wait for granulation to commence or immediately proceed with the sponge grafting. By either method I have obtained good results.

The best sponges for our purpose are the small Levant, or, as commonly called, surgical sponge. It has a soft, fine and very elastic texture, a light color, and great toughness of fiber. It is very free from its gelatinous flesh when prepared for market. For grafting the sponge must be carefully perpared to remove all calcareous particles and rendered thoroughly aseptic. It should first be well beaten and then immersed for not less than an hour in a dilute muriatic acid solution to remove all particles of lime. Now it should be well washed in cold water, then in hot water with green soap, at the same time thoroughly kneading with the hands. It should now be well rinsed out with sterilized water and then immersed in a 5 per cent solution of carbolic acid, in which it may remain until required for use. At the time of the operation, after we have carefully prepared the wound cavity, the sponge should be removed from the solution, well washed out in a sterile salt solution, and then trimmed with scissors to fit accurately the cavity. This latter should receive a last washing out with the salt solution, then place the sponge therein and cover with gutta-percha protective, over which apply an ordinary dressing.

The following are a few cases illustrating the use of sponges for grafting:

Case I: W. M., female, aged 14. In 1890 received an injury to the knee, from which resulted a most extensive cellulitis, followed by sloughing of the skin, and in one place the deeper structures. The sloughs extended from the upper part of the thigh to the ankle on the external surface of the leg, and at the knee completely surrounded it. Dr. J. E. Summers saw her in consultation and advised trying to save the limb. He operated, cleaning up the sloughs. There was a large cavity on the outside of the lower end of the thigh extending into the bone, but not communicating with the joint. This was three inches by two inches, and at least one and a half inches deep. A few days after the operation, when granulations had well commenced and were in a healthy condition, I filled this hole with sponge. It did well, and in about two weeks was completely filled with granulations, and a considerable part of the sponge was absorbed. At the end of six weeks the whole was absorbed and the granulations were level with the surrounding tissues. I then skin-grafted and got a most excellent result throughout.

Case II: Carl L., aged 6, while attempting to climb on a wagon loaded with hay, had both feet crushed between the wheel and the stanchion. The right foot was bruised and crushed, but the left was crushed to such an extent that amputation seemed almost inevitable. I made the attempt to save it. I dressed with moist boracic acid dressings and waited for the sloughs to separate. This they did in about two weeks, leaving a large surface of granulating tissue. On the outside of the foot it extended from the base of the small toe to the ankle, but was only skin deep. On the inside it extended from the great toe to the heel and involved the sole. About the center of the space there was a hole about as large as a small hen's egg. I filled this with sponge

and covered the rest with Thiersch's grafts. In about three weeks the sponge was so far absorbed, its place being taken up by healthy granulations, that I could cover them with Thiersch's skin grafts and got, as a result, an almost perfect foot.

Case III: J. R., male, aged 9, had leg and foot badly injured by being thrown from a horse. Osteomyelitis supervened. When I first saw him, some months after the accident, I found openings in the lower end of the leg and about the ankle, with sinuses leading to dead bone in the shaft and end of tibia. I operated, removing a large sequestrum from the shaft of the bone and a considerable amount of carious bone from the end. In fact, there was merely a shell left after it was thoroughly cleaned up. On making a careful examination and finding no more dead bone, I decided to try filling the cavity with sponge. As I did not have my material ready at that time I two days later proceeded to sponge graft. After carefully preparing the wound and sponges I filled the hole, fitting the sponge accurately to the entire cavity. I arranged for drainage and brought the soft parts together, dressing with iodoform gauze and absorbent cotton. The result was beyond my most sanguine expectations. The skin united by first intention throughout, with the exception of the place I had left for drainage. In six weeks the boy was able to use the leg, and to-day, nearly two years after, he has an almost perfect limb.

Case IV: Mrs. B. N., aged 22. Came to me in September, 1897. She had sinuses about the ankle and heel of the left foot. She had been operated upon for disease of these bones some three years before, but as the sinuses had never closed, the trouble had evidently not been completely removed. On cutting in I found tubercular caries of the astragalus and os calcis, which I removed by chiseling and the use of Volkmann's spoon. The resulting cavity was quite large, about the size of a large-sized walnut. I carefully examined the walls with a small electric light to see that there were no tubercular foci left, and then put in a sponge. This did well, and with the exception of slight discharge healed very kindly.

I have cited the above cases to show the good results obtained at my hands by the use of sponge grafting to aid the filling of cavities in soft tissue and in bone.—West. Med. Rev.

Car Sickness.

When a person who contemplates a journey details a history of car sickness, I advise a dose of calomel at night and Epsom salts before breakfast the day of starting, since during the journey and often for a day or two after the trip the bowels are constipated. Light, digestible food is allowed. In an emergency case my usual treatment is to lay the patient down in as comfortable a position as possible, apply a bandage to the eyes with cold water and give a tablet consisting of acetanilid, gr. iiiss.; sodium bicarbonate, gr. i.; sodium bromide, gr. 1-10; citrate of Caffeine, gr. iss., and, if the heart's action seems weak, trinitrin, gr. 1-100.—W. M. Bemus in Med. Record.

Notices and Reviews.

"A Manual of Modern Surgery, General and Operative," by John Chalmers Dacosta, M. D. with 386 illustrations. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. Half morocco, $5.00; cloth, $4.00 net.

This is the second edition of Dacosta's valuable and serviceable manual. The comparison between this edition and the first shows numerous additions and alterations, all of which give still greater worth to the book. As is well known, this volume has been adopted by many of the medical schools as the text-book for the students, and properly so, for the various surgical subjects are treated in a concise and yet sufficiently comprehensive manner to cover the field thoroughly.

The arrangement of subjects in the order in which the author has placed them may be a question for discussion. It would seem more logical to consider the normal, physiological process of repair first and then to discuss the interference with the normal process, namely, inflammation, afterward. In his arrangement the author has, however, followed the example set by most of the authors of surgical works.

The book is unquestionably the best of its kind and one which deserves introduction as a text-book into all the schools.

The illustrations are for the most part well done, and illustrative of what it is intended they should explain.

The printer's work is good and the size of the volume such as to make it easily handled, and its price brings it within reach of the medical student. LUTZ.

"Practical Uranalysis and Urinary Diagnosis: A Manual for the Use of Physicians, Surgeons and Students." By Charles W. Purdy, M. D., LL. D., Professor of Clinical Medicine at the Chicago Post-Graduate Medical School. Fourth, Revised Edition.

With numerous illustrations. Crown octavo. pp. 365. Extra cloth, $2.50 net. The F. A. Davis Company, Philadelphia, New York, Chicago.

The fact that editions of this work have been called for at the rate of one a year shows that this book at least fills a long-felt want.

For those who have not seen the previous editions it may be stated that the work is divided into two sections. The first is devoted to the chemistry of the urine and its sediments, and owing to advances in our knowledge of this part of the subject, this section has been largely rewritten.

The second section comprises "Urinary Diagnosis" and treats of the urine in the various diseases of the kidneys and urinary passages. In this section some rather strong statements are found, that is, judged by our present knowledge. For example, "Catheterization of the ureters, as yet, is applicable only to limited cases—in the female," and again, "Nor can any of the instruments in present use be depended upon to meet the purpose." Surely the instrument devised by Harris of Chicago meets the purpose.

There is an appendix treating of uranalysis for life insurance which is very valuable and worth the price of the book, and a list of reagents and apparatus required.

The colored plates and black illustrations are very satisfactory.

"A Text-book of Obstetrics," by Barton Cooke Hirst, M. D., Professor of Obstetrics in the University of Pennsylvania. With 653 illustrations. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Cloth, $5.00 net; sheep or half morocco, $6.00 net.

In a short, business-like preface the well-known author informs us that the work is the result of twelve years' practice in obstetrics and gynæcology proper. As he has been consultant and attendant, during this period, to eight of the principal Philadelphia hospitals, his clinical experience has been correspondingly great.

There are seven sections in the book. The first concerns pregnancy, and after an introductory chapter on anatomy, the following subjects are successively considered: Ovulation, fertilization, development, diseases of the fœtus and the physiology and pathology of pregnancy. The diseases of the appendages of the fœtus follow the account of their development. Section II is devoted to the physiology and management of labor and the puerperium, and Section III to the mechanism of labor. In the next two sections the pathology of labor and the puerperium are taken up.

Section VI comprises obstetric operations, and the work concludes with a section on the physiology and pathology of the new-born infant.

The work is eminently practical and embodies the results of all recent researches. For instance, a sufficiently full account is given of deciduoma or syncytioma or placentoma malignum. The majority of the illustrations are original photographs and are admirable aids to the text. The print, of course, is as clear as can be wished and a positive pleasure to read.

No attempt is made to give a complete bibliography, which is impracticable on account of the necessary condensation of the text, only those books and articles being referred to which are especially valuable or epoch-making. Anyone who wishes a complete text-book on obstetrics will find this work truly multum in parvo. A comprehensive index occupies no less than forty-six pages.

"The Medical News Pocket Formulary for 1899"—Containing 1,600 prescriptions, representing the latest and most approved methods of administering remedial agents. By E. Quin Thornton, M. D., Demonstrator of Therapeutics, Pharmacy and Materia Medica in the Jefferson Medical College, Philadelphia. In one wallet-shaped volume, strongly bound in leather, with pocket and pencil. $1.50, net. Philadelphia and New York: Lea Brothers & Co. Chicago: E. H. Colegrove.

This work consists of a prefatory section on weights and measures, incompatibles, antidotes and a dose table, and next come the formulas, which are arranged alphabetically and cover about everything that the practitioner is called upon to treat. The author believes the book has a broad field of usefulness, and that "the best informed practitioner may at times overlook an appropriate drug, and the young physician will perform his duty better if he has at hand the collective experience of the profession."

Even for those who prefer to draw up their own formulas this work will furnish many useful suggestions, as it is strictly up to date. The doses are given in both the metric and

apothecaries' weights. It is substantially bound in pocketbook form.

"The Care of the Baby." By J. P. Crozier Griffith, M. D., Clinical Professor of Diseases of Children, University of Pennsylvania. Second edition, revised. 404 pages, with 67 illustrations and 5 plates. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Price, $1.50.

While this work is written for mothers and nurses, and not for physicians, it can be profitably consulted by the younger members of the craft, who are often embarrassed in their early practice by "Grandma's" wisdom. Most of the work is devoted to infantile hygiene, such topics being discussed as toilet, clothes, food, sleep, exercise, etc. The sick baby is considered also, though, of course, nothing is said as to treatment, instruction being given as to when a physician's aid is necessary. An appendix contains much useful information in the way of recipes for foods, poultices, directions for baths, etc. It would make an exceedingly appropriate present from the family physician to the young mother, prospective or actual.

"The Physician's Visiting List" (Lindsay and Blakiston's) for 1899. Forty-eighth year of its publication. Philadelphia: P. Blakiston, Son & Co. Chicago: E. H. Colegrove. 1898. Price, $1.00.

Any extended notice of this list which antedates the vast majority of the medical journals in the country would be a travesty. Suffice it to say that it is, as usual, compact, and with a select list of reference tables. A strong and durable cover completes the list ot attractions.

"American Pocket-Medical Dictionary." By W. A. Newman Dorland, A. M., M. D. Containing the Pronunciation and Definition of over 26,000 of the Terms Used in Medicine and the Kindred Sciences, Along with over 60 Extensive Tables. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Price $1.25 net.

"A Pocket Medical Dictionary; giving the Pronunciation and Definition of the Principal Words Used in Medicine and the Collateral Sciences." By George M. Gould, A. M., M. D. A new edition entirely rewritten and enlarged, including over 21,000 words. Philadelphia: P. Blakiston's Son & Co. Chicago: E. H. Colegrove. 1898. Price $1.

It is very difficult to choose between these works. Both are written by competent authorities, are nicely and clearly printed and substantially bound. Again Dr. Gould in his preface acknowledges the assistance of Dr. Dorland in the compilation of his dictionary, so there is another feature common to both. As the former dictionary contains some 5,000 more words than the other, it is naturally larger, and does not fit the pocket so readily. However, this is a minor fault, and many will no doubt prefer the larger size, even at some slight inconvenience in handling. We decline to award the palm, and advise intending purchasers to compare them. Possibly they can make up their minds; we cannot.

"The Essentials of Materia Medica, Therapeutics and Prescription Writing," arranged in the form of questions and answers, prepared especially for students of medicine, by Henry Morris, M. D. Fifth Edition, revised and enlarged. pp. 288. Philadelphia: W. B .Saunders; Chicago: W. T. Keener. 1898. Price, $1.00.

The author of this little work states his object very clearly, has followed it closely, and therefore has prepared one of the best reviews of these subjects.

His classification is based on therapy and presents many advantages. The time has certainly come when we should classify our remedies and not leave it to the untried student to make from an alphabetical list of drugs. The lines followed in the classification may differ, but some definite form should be taught the student. We find the metric and apothecary systems used together, thus giving an additional aid to the modern medical student. The text has been thoroughly revised and brought up to the date of its publication. The book will be found very useful for anyone desiring to revise the entire subject in a short space of time.

J. A. PATTON.

PAMPHLETS RECEIVED.

"Suggestions as to the Use of Digitalis—The Causes of the Inconstancy of Mitral Regurgitant Murmurs—A Case of Ruptured Aortic Aneurism—Suit for Accident Insurance," by J. N. Hall, M. D., of Denver, Colo.

"Abuse and Dangers of Cocain," by W. Scheppegrell, M. D., of New Orleans.

"Criminality of Railroad Ticket Brokerage, etc." Chicago, 1898.

"The Dangers of Specialism in Medicine—Manifestations of Syphilis in the Mouth," by L. Duncan Bulkley, A. M., M. D., of New York City.

"The Surgical Treatment of Uterine Myomata," by Henry O. Marcy, A. M., M. D., LL.D., of Boston, Mass.

"Proceedings of National Pure Food and Drug Congress," held in Washington, March 2, 3, 4 and 5, 1898.

"Stricture of the Œsophagus and Its Surgical Treatment, with a Report of a Number of Rare and Interesting Cases," by James G. Hunt, M. D., of Utica, N. Y.

"Modern Treatment of Tuberculosis," by Charles Denison, A. M., M. D., of Denver, Colo.

"Tuberculosis of the Mammary Gland," by A. E. Halstead, M. D., and E. R. Le Count, M. D., of Chicago.

"Melancholia," by W. Xavier Sudduth, A. M., M. D., of Chicago, Ill.

"Some Observations of General Interest Regarding the Course and Management of Cataract," by J. H. Woodward, B. S., M. D., of New York City.

"Further Observations Regarding the Use of the Bone Clamp in Ununited Fractures, Fractures with Mal-Union, and Recent Fractures with a tendency to displacement," by Clayton Parkhill, M. D., of Denver, Colo.

"Chronic Catarrh of the Stomach—Intestinal Auto-Intoxication—Gastroptosis — Transillumination of the Stomach," by Chas. D. Aaron, M. D., of Detroit, Mich.

"Study of a Case of Rickets, with Skiagrams—Some of the Problems Connected with the Study of Pediatrics—Urethritis in Male Children," by Isaac A. Abt, M. D., of Chicago.

Announcement.

Messrs. Lea Brothers & Co. announce for publication, in March, 1899, the first volume of "Progressive Medicine," a new annual in four handsome octavo, cloth bound and richly illustrated volumes of about 400 pages each. The volumes will appear at intervals of three months. In this age of unusual progress, so rapid is the advance in all departments of medical and surgical science that the need for condensed summaries which shall keep the practitioner up to date at the least possible expenditure of valuable time has become imperative. It is with the object of presenting only such readable and useful material that these volumes are published, and every contributor to the pages of "Progressive Medicine" will say what he has to say in an original narrative form, so that every statement will bear a personal imprint expressing not only the views of the author cited, but the opinion of the contributor as well.

To insure harmony of statement, each narrative will receive the careful supervision of the general editor, Dr. Hobart Amory Hare. Those associated with Dr. Hare include a brilliant gathering of the younger element of the profession, well representing the class which is so energetically contributing to make modern medical history.

The publishers offer to send full descriptive circulars and sample pages to those applying for them.

Personal.

Dr. J. B. Huntington of Ilwaco, Wash., has been appointed physician of the O. R. & N. Railroad Company, with headquarters at Starbuck, Wash.

Dr. J. J. Buckley of Missoula, Mont., chief surgeon Northern Pacific, has been appointed on the State Medical Board to fill the vacancy caused by the resignation of Dr. J. M. Sligh of Anaconda.

B. B. Osler, Q. C., of Toronto, has been selected by the Grand Trunk as their arbitrator in the settlement of the grievances of the Grand Trunk telegraph operators, and he and Mr. Sargent of the Order of Railway Firemen, who represents the telegraphers, will meet on January 6 to select a third arbitrator.

Railway Miscellany.

William T. Moore, who was formerly for many years master mechanic of the Pittsburg division of the Pennsylvania railroad, died at his home in Sewickley, Pa., December 1, at the age of 74 years.

The annual report of the general superintendent of the railway mail service shows that at the close of the year there were 8,074 clerks employed, and that with the closed pouch and express pouch service the grand total of miles traveled in the service was 285,565,343. There were 597 casualties, in which 7 clerks were killed, 34 seriously injured and 146 slightly injured. It is urged that some provision be made by Congress for the relief of the families of the clerks killed while on duty and for the creation of a railway mail service relief fund for the benefit of mail clerks totally disabled or injured in the line of duty. It is estimated that $8,928,118 will be required for salaries of railway postal clerks for the year ending June

30, 1900, and $4,204,500 for railway postoffice cars (exclusive of subsidized lines).

The conclusion of the financial arrangements for the construction of the extensions of the St. Louis, Peoria & Northern, meaning the completion of another and advantageous line between Chicago and St. Louis, is an event of great importance in railway affairs. The St. Louis, Peoria & Northern now extends from St. Louis to Peoria, 164½ miles, the line from Springfield to Peoria, 63 miles, having been constructed within the past two years. The extensions to be built include not only a line from Peoria to Chicago, but also an extension of about 90 miles from Peoria northwest to East Clinton, and a link from Marine to Sparta, Ill., about 50 miles, to connect at the latter point with the Mobile & Ohio. Ample capital ($13,000,000) has been secured for construction purposes, and it is understood that work on the new lines is to be pushed.

The passenger fare on the White Pass & Yukon road from Skaguay to White Pass City, Alaska, 16 miles, is $5. Passengers are allowed 150 pounds of baggage. The freight traffic to White Pass City is $3.50 per 100 pounds; in lots of 200 pounds, $3.25 per 100; in lots of 300 pounds, $3 per 100; in lots of 400 pounds, $2.90 per 100. Packers' rates are added to Log Cabin and Lake Bennett. A special commodity tariff has been issued on lumber, mining and steamboat machinery, building material and sheet and corrugated iron of $2 per 100 pounds, in lots of two or more carloads, f. o. b., minimum weight 18,000 pounds. Traffic Manager Gray is figuring on 3,000 tons of freight for shipment to the Lake Atlin country and to the Klondike between January 1 and July 1 of next year. This freight will be transported for about $150 a ton, and the entire contract will aggregate $450,000. From the summit of the pass freight is taken on to Lake Bennett by packers.

The suit of Gov. Pingree of Michigan to compel the Michigan Central Railroad to sell him a 1,000-mile family ticket at the rate of 2 cents per mile under the law of 1891, has been decided in favor of the company by the supreme court of the state. This suit, it will be remembered, was brought early in the present year, the railroad having declined to sell the ticket on account of the provision in its special charter giving it the right to fix its own rates of fare, provided such fare does not exceed 3 cents a mile. Although the special charter was granted in 1846 for a period of only thirty years, the company contends that it is still operative, because the law granting it has never been repealed. Counsel for the plaintiff claimed that the company had forfeited its charter by owning and controlling a number of other roads, which was held to be in effect a consolidation. The lower court decided in favor of the complainant and ordered a mandamus to issue compelling the Michigan Central to sell to the plaintiff the ticket requested. An appeal was taken to the state supreme court, which, in a unanimous opinion, reverses the decision of the lower court and holds that the company has "a vested right to fix its own tolls, and that to hold the act of 1891 applicable to it would be to impair the obligation of the contract made between the state and the company." The court further holds that the company has not violated its charter by effecting consolidations with other companies, and says: "The mere purchase by one railroad corporation of the franchise and property of another does not make the purchaser the successor by consolidation of the purchased road."

The Closets on Trains.

Dr. R. S. Thornton, in a paper on "The Wind as a Factor in Spreading Infection," has the following sensible remarks and suggestion: "The second point concerns the public health authorities and has to do with the water closets in use on the railway trains. These are, for the most part, open chutes down which the excreta are projected to the railway track. Many people with ambulatory typhoid, and patients in various stages of the disease en route to hospitals or home, use these closets, and thus typhoid stools are spread along the railway, ready for distribution by the wind all over the neighboring country. The same thing might happen were cholera ever to obtain a footing on this continent; but apart from the specific danger in such diseases the method is unhygienic and offensive. It should not be difficult to attach a box below the chute and adopt some modification of the earth closet, the excreta being removed and buried at divisional points along the line."—N. Y. Med. J.

Medical Appliances in French Railway-trains.

A recent accident near the Gare du Nord, in Paris has directed the attention of the French officials to the advisability of having on railway trains appliances and medicinal agents to be employed in case of accident. Because of the want of these the injured in the recent accident were in distress for a considerable time. The French Minister of Public Works has given orders that henceforth the necessary appliances and medicines shall be on all trains and in all railway stations.—Phil. Med. J.

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THE NATURE AND PATHOLOGY OF SHOCK. *

BY FRANK J. LUTZ, M. D., OF ST. LOUIS, MO.

More than speculative value attaches to a correct understanding of the nature and pathology of shock. The frequency with which the condition occurs by itself or as a complication; its often fatal termination; the influence which its existence has in deciding the question of the use of anæsthetics and the advisability of operative interference, as well as upon the course of the changes which follow the injuries with which it is associated, to say nothing of its medico-legal aspects and its interesting relationship to traumatic neurasthenia, make shock a matter of the gravest concern to the surgeon.

To recognize it and the proper interpretation of its clinical manifestations furnish the basis for efficient action. It is not surprising that surgeons have been familiar with its symptoms for almost a century. The appalling picture presented overshadows for the time being the crushed limb, the incarcerated hernia, the perforated abdomen or the disjointed member. The numerous and ofttimes ingenious explanations offered concerning its nature partook, to a great extent, of a speculative character until experiment was added to bedside observation.

The various hypotheses which have been advanced may in a general way be grouped under two headings. (1) The hæmato-pathologic and (2) the neuro-pathologic, according as the heart and blood vessels are made responsible for the condition on the one hand, or the central nervous system on the other.

It can be safely asserted that the attempt to refer all the phenomena of shock to reflex irritation of the vagus nerve and therefore to reflex paralysis of the heart, has not been successful in explaining satisfactorily either the clinical symptoms or the findings during operation or post-mortem.

The vaso-motor disturbances which H. Fischer has made the central point around which revolves the explanation of the clinical symptoms present a theory which cannot be brushed aside so easily—for it contains at least part of the truth. To the classical observations of Goltz concerning the disturbances in the nerve centers of the frog, which follow percussion of the abdominal wall, has very properly been assigned a most important place in the various theories explanatory of shock. The interpretation of these observations, however, has led to conclusions not intended by him and not warranted by the facts. Far from considering all the phenomena of shock are dependent solely upon reflex paralysis of the heart and vaso-motor nerves, Goltz himself has emphasized the fact that he has observed very pronounced symptoms affecting respiration, the motor apparatus, sensibility and reflex irritability in the frog, even before disturbances of the heart's action and a diminution of vascular tonicity became apparent.

If a frog be let fall from some height, phenomena are observable which Goltz summarizes in these words: "The involuntary movements, respiration and the heart beat stop entirely until the animal gradually recovers. The concussion which is sufficient to produce temporary paralysis of all the automatic movements, so called, produces no disturbances of tissues which are noticeable by our senses. It is manifest that during such a concussion the points in question are not alterations in the muscles or nerve trunks but alterations in the organs of the central nervous system. The nerve centers get into a condition of insensibility in which they no longer react to the normal stimuli." Clearly this does not justify the conception

*Read in the Symposium on Shock, Toronto, 1898.

of shock which many physiologists have attributed to Goltz.

H. Fischer, considering the patent abdominal plethora, in marked contrast with the exsanguined appearance of the skin, the extremities and other portions of the body, and the cessation of the heart's action during diastole, which follows percussion of the abdominal wall in the frog, supposed a similar fullness of the entire vascular system of the abdomen in shock occuring in man; and in view of the experiments of Bezold, which demonstrated that cutting the splanchnic produces abdominal plethora, Fischer explained shock as a reflex paralysis of the vaso-motor nerves, more particularly of the splanchnic. It is true it cannot be gainsaid that some of the symptoms of shock are explained by Fischer's theory—but it is by no means explanatory of all. The greatest distension of the abdominal blood vessels can be considered only a very small "intra-vascular hemorrhage" as the very exact experiments and observations of Ludwig have shown, and therefore it is impossible to explain the symptoms of shock as dependent upon anæmia. But in addition, and this is of yet greater weight and importance, neither upon the operating table nor in the laboratory is abdominal plethora a constant finding in persons suffering from shock, or in warm blooded animals in which the condition of shock has been produced experimentally by percussion of the spinal cord. It must be apparent therefore that the hypothesis which explains the symptoms of shock by a pronounced diminution of the circulatory medium is not convincing.

The views of Leyden, on the other hand, offer a much more satisfactory solution of this problem. Leyden considers shock "a reflex inhibition" of the functions of the spinal cord; according to him violent peripheral irritation produces such molecular changes in the central nervous substance that it cannot for the time being respond to less intense irritations. All the functions of the spinal cord, motion and sensation, the vaso-motor nerves, respiration and the heart's action, are paralyzed or at least reduced to a minimum, while the brain is not, as a rule affected by these disturbances —the sensorium remaining clear and unaffected. Stupor, coma or delirum are symptoms rarely present. Leyden's conception of the nature of shock, although not entirely devoid of a hypothetical character, is very attractive and convincing, since it appears to furnish a satisfactory explanation of the tout ensemble of the symptoms, lacking in some of the details only an exhaustive and definite establishment of its truth. The enlargement of its scope and the modifications necessary have been furnished to a remarkably conclusive degree by the classical studies and experiments of Groeninger.

The more thoroughly we examine the clinical symptoms of shock, the more firm becomes the conviction that their explanation must rest upon the solid foundation of physiological facts. And foremost stands the physiological axiom formulated by Savory: "Action involves exhaustion, and repose is needed for repair. The greater the effort, the greater the exhaustion." Mechanical irritation of sensitive nerves is followed by changes in their equilibrium, which are transmitted peripherally as well as centripetally. Sensation is the result of centripetal irritation. Both in the nerve itself and in its center, there occurs consumption of tissue as well as molecular change—and repeated irritation is followed by chemical changes and by a diminution of the power to respond to further irritation. Fatigue follows function and exhaustion represents its extreme degree and is in proportion to the suddenness and amount of the irritation. Nor are fatigue and exhaustion confined to the peripheral nerves! they involve the central nervous system as well. Violent irritation of sensitive peripheral or sympathetic nerves may result in a condition of exhaustion of the spinal cord, which is evidenced by enfeeblement of motion, sensation and the power of reflex action. This exhaustion is not limited to the point of origin of the nerves involved, but spreads ordinarily over larger sections of the cord. Sudden concussion, involving central organs directly or indirectly, is followed by the same conditions of exhaustion. We know also that physiologically both local circulatory disturbances as well as changes in the central circulatory apparatus follow in the wake; their depressing influence upon the heart's action and upon respiration are well understood and intense irritation even though not followed by destruction of nerve elements may result in complete exhaustion and temporary suspension of function.

Unfortunately our knowledge of the cell changes which occur in the spinal cord in connection with shock is not complete. One dare not speak of pure neuroses without qualifying the expression by the hope that the pathological anatomy of the condition will before long be established.

If we were to present the definition of Groeninger, and explain shock as fatigue or exhaustion of the spinal cord and medulla oblongata, brought about by sudden violent irritation, and classify it among the "functional disturbances," it might be considered as explanatory of the functional disturbances but it is not descriptive of all the physical changes connected with these disturbances. For the present this is, however, all we can do. A wide field for scientific observation in this direction is as yet unexplored. Many observations are suggestive of the probable condition of the cells of the cord in shock and it is not entirely gratuitous to say that metabolic changes similar to those found in nerve centers after functional activity, more pronounced perhaps but yet similar, follow temporary exhaustion of the cord and that these changes may gradually disappear after intervals of rest. If this be not true, then why do not all cases of shock end fatally?

The intimate association and the similarity of the symptoms which follow the loss of a large quantity of blood and those which are representative of pure shock at once come to mind. This interesting phase of the subject will, I feel confident, be presented to you in an able and exhaustive manner as well as the different causes, psychical and physical, which are productive of shock.

In the early, or what may be called the statistical, stage of abdominal surgery the test of the successful operator was simply recovery from the operation. Now, it is the relief of symptoms, or the restoration of impaired functions. In other words, we look to ultimate rather than to immediate results.—H. C. Coe.

It is often much more difficult to diagnose fracture of the ribs than is commonly thought to be the case. If you cannot satisfy yourself that a rib is broken, but get many of the subjective signs of such a fracture, treat the case as if you were sure that the solution of continuity really existed.—Int. J. Surg.

RECENT WORK BEARING UPON THE PATHOLOGY AND MORBID ANATOMY OF SHOCK. *

By Wyatt G. Johnston, M. D., of Montreal, Can.,

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I recollect one of my teachers in Pathology quoting in full Johannes Müller's lecture upon the functions of the spleen, the full text of which is alleged to be as follows: "Gentlemen: We will consider to-day the functions of the spleen. As nothing at all is known about the functions of the spleen we will therefore pass on to the next subject." The pathology and anatomy of shock appear to be treated in much the same summary manner by those who write on the subject. Pearce Bailey, "Accident and Injury in Relation to Diseases of the Nervous System" (p. 202), writes as follows:

"The belief which was at first systematically formulated by Page has now become general, that in by far the larger number of litigated cases of nervous disorders which follow railway and allied accidents there is no gross injury to the nervous tissue. Psychical concussion may be a cause of subjective nervous symptoms, and if severe may indirectly cause organic injury. But the conception as a cause for general nervous symptoms and as a pathological condition is without foundation and has been almost entirely abandoned. By far the larger number of cases of the traumatic neuroses may be explained by the theory that the symptoms are those of hysteria or neurasthenia, functional disorders of which the pathology is unknown. There are, however, a few cases in which the symptoms are somewhat different from those of hysteria or neurasthenia, and which may depend upon the structural lesions of the brain and cord though our knowledge of their pathology is largely speculative."

Again the same author (Ibid p. 233) says: "Little is known of the pathology of neurasthenia. It rarely kills, and there are no recorded autopsies in which the lesions found were sufficiently adequate to account for the neurasthenic symptoms. In the autopsies which

* Read in the Symposium on Shock, Toronto, 1898.

have been made of persons who died during the course of the disorder the nervous system has not been examined with sufficient care to discover any morbid appearances in the ganglion cells. Hodge, and, more recently, Lugaro have shown, however, that visible alterations in form and structure occur in the ganglion cells of animals as a result of fatigue. And since fatigue is the most prominent feature in the clinical picture of neuræsthenia it is to be inferred that the pathology of the disorder is to be sought for in the nutritional disturbances of the ganglion cells. It would be useless to speculate here as to how these changes are brought about or what their essential characteristics are. It is enough to say that it seems probable that to explain the disturbances of function there are structural changes which may eventually be seen and to a certain extent understood. But until our knowledge regarding the pathology of neuræsthenia is more exact and full, it must continue to be classed with the functional diseases."

I have selected this author as being the most recent American writer on the subject and because his statements represent correctly the general consensus of opinion on this subject at present. While the remarks above quoted refer more particularly to the traumatic neuroses which are chronic in character and whose relations to shock are remote they also apply to the acute and immediate effects of shock, such as appear after severe injuries from crushing or other causes. The essential feature which all forms have in common is that the discoverable nerve lesions are far from characteristic and are not extensive enough to explain the profound and often very complicated disturbances of the nervous function found clinically. The fact that in one case a profound condition of shock may accompany a relatively slight injury while in a severer injury little or no shock may exist, also that in some cases the shock may be late in appearing points on the whole to the central rather than the peripheral nervous system being chiefly affected. It is in the ganglion cells of the brain cortex and the spinal cord, but especially the former, that changes have been sought for.

Virchow found nearly thirty years ago, in examining bodies where severe cerebral concussion had occurred years before, that the same ganglion cells, or as they are now called, neurons, were frequently found to be calcified, and hence it appeared probable that anatomical changes had existed in them at the time of the accident. This point was not established experimentally, however, and for many years no further anatomical observations of importance were made on the subject. In 1890, Schmaus of Munich made a number of observations and experiments as to the connection between myelitis and compression or other injuries of the cord. By striking upon a board placed along the back of a rabbit he was able to produce a series of paralytic and paretic symptoms with almost an absence of gross lesions, capillary hemorrhages being almost the only anatomical change. Schmaus' studies were made more with reference to the fibers than the nerve cells and did not establish the occurrence of changes in these, but the more recent investigations in the same direction by Kirschgässer showed alterations in the cells also.

Within the past five years, the study of the neuron or ganglion cell has attracted much attention from neuro-pathologists. The various modifications of the Golgi method have enabled the changes in the fibers to be studied with precision, while still more recently a number of methods, notably those of Nissl, Van Gieson, and Barker, have enabled the minute changes in the ganglion cells to be studied out. The result of these studies has been to show that a number of important changes can be made out in the arrangement of the chromatin and the cell substance. This is shown in some cases by the abnormal distribution of the chromatin particles, in others by their almost complete disappearance. As the authors by no means agree yet among themselves as to the exact character of the lesions or their significance they need not be discussed at length here.

In addition we must bear in mind the occurrence of artefact effects due to the methods employed and of post-mortem changes previous to the autopsy. Further the particular method employed and especially the personal equation where different observers employ the same method seem to cause differences in the result. This will explain in large measure the numerous minor discrepancies and diversities of opinion in the literature of the subject.

Within the last few years however, the ad-

vances made in neuro-pathology and in microscopical technique, valuable for the study of conditions, is such as, I think, to necessitate revision of this too agnostic standpoint. In the many articles published on the subject, the tendency is to show that changes of some sort in the ganglion cells are a fairly constant accompaniment of injury to the nerve centers which apparently leave no gross changes. The procedures employed by Van Gehuchten, Goldscheider and Flatau, Hodge, Levi, Mann, Lugaro and others agree in the main as to the fact of such changes being demonstratable, although there is a want of uniformity as to their exact nature. Ewing and Van Gieson have rendered important service in pointing out clearly the distinctions between artefact changes, due to decomposition, and those really representing marked alteration in the nerve tissues: We have the latter again occurring under two sets of conditions: one where the nervous tissue alone is especially involved, and the other where it forms part of a general disturbance as in the case of toxæmia, etc.

The studies of Kempner and Pollock, that a number of definite changes in the nerve cells occur after infection or intoxication with the products of the sausage poison bacillus (B. botulinus) further afford the important evidence that when injected with protective serum these changes remain absent. It is noticeable that some of the most striking changes which attract the eye of the observer, such as the vacuolation of the nerve cells, etc., are now known to be merely post-mortem in origin.

With regard to the psychical element upon which so much stress has been laid, this perhaps has been unduly exaggerated. Morton Prince's observations on this point are very striking; he investigated a large number of football players of American colleges without finding a single instance of the conditions analogous to "Railway Spine," as a result of the game. Now short of actual warfare and railway collisions, there is probably no condition which would seem at first sight more conducive to spinal and nervous concussions than football as played in American colleges. He explains the absence of the neuræsthenic symptoms by the mental state of preparedness and the concussions being far from unexpected. Similarly, the fact that railway employes are more or less in a state of expectantness, and this explains their greater immunity than passengers, and of course the various emotions, fright, etc., are less liable to affect them than the latter.

The studies of the nerve cells hitherto have given much information as to changes in structure but little as to changes in function, although Hodge found that in stimulating the nervous cells in guinea pigs he produced a state of exhaustion with a lessened amount of chromatin; this change has not been quite satisfactorily corroborated by others. In any case, attention has been fixed, perhaps too much, on the chromatin elements, which have possibly only a minor part in exhibiting the functional activity of the nerve cells. It is obvious that some procedure in demonstrating the chemical and metabolic changes which take place would be capable of throwing great light upon this matter. This want to some extent has been supplied, at least as regards phosphorus, by the method of Lilienfeld and Monti (Ztsch. f. Physiolog. Chemie., 1893), who used the phospho-reaction brought out by means of molybdate of ammonia reduced by pyrogallol as an evidence of the relative abundance or lessened quantity of phosphorus compounds in the cells, which, as regards function, is perhaps a better index than the chromatin. The reaction has been used by a number of others, including Sherrington and Helde. It was found somewhat uncertain in regard to tissues though useful in test tube experiments.

A decided improvement in technique has been found by A. B. Macallum of Toronto, who uses an aqueous solution of 1—4 per cent phenyl hydrosine hydrochloride, which must not be more than 2 or 3 days old. It distinguishes sharply between the molybdate compounds and the phospho-molybdate compounds, the former appearing brown, the latter dark green, at first almost black; the reaction is certain in the absence of an alcohol or a caustic alkali. On adding an acid solution of molybdate ammonium and nitric acid, a deep blue violet color appears.

Details of methods are very fully given in Dr. Macallum's paper (Proc. Royal Soc., Vol. 63, p. 467, 1898). Mr. P. H. Scott, working under his directions, found that the Nissl's granules in the nerve cells gave a distinct phosphorus reaction which was also present in the nerve elements of the retina in an eye which

had been exhausted by prolonged exposure to light, and the corresponding eye blindfolded, in experiments on rabbits. Dr. Macallum has kindly written to me concerning the necessity of great care in the preparation of the reagents, especially in the keeping of the acid ammonium molybdate solution tightly stoppered so as to prevent evaporation. The nitrate molybdate reagent is improved by dissolving one part of pure molybdic acid in four parts of strong ammonia and adding thereto, slowly, 15 parts of acid, nitrate, sp. g. 1. 2, proportions indicate weight. Solution is faintly yellow with decantation, remaining free from precipitate.

It seems desirable that an examination should be made of the condition of the nerve elements with regard to the presence or absence of such changes in cases of shock. There is a good deal of clinical evidence to show that in the absence of gross alteration in the functions some condition is present where the vital powers are greatly lessened, and a slight additional disturbance of this vital force will produce unexpectedly fatal results. For instance, it is common to find cases transported long distances and apparently suffering from a mild degree of shock for a trifling operation, perhaps the removal of a nearly detached limb seems expedient, and a whiff of chloroform or ether is given and the patient never rallies from this short and trivial anæsthesia; this occurs most commonly in alcoholic subjects.

In reference to this point I wish to call attention to the recent studies of H. K. Wright, formerly of Montreal, who has shown that organic changes of the nature of granular degeneration in the nerve cells process occurs as the result of overdoses of bromide of potassium, either in man or animals. He has also shown that a similar condition is produced by chloroform and ether anæsthesia, and this may explain in part why the accidents occurring as above described so frequently follow the administration of an anæsthetic. At the same time we must not too hastily conclude that the neuron which has become so prominent lately is to be made the base for everything in neuro-pathology, as apart from the previous explanation of late death after anæsthetics in epilepsy probably, and in Graves' disease certainly, the disturbances of the internal secretions, owing to the irregular and abnormal condition of the thyroid gland, appear to be a true explanation of the difficulty. As regards epilepsy, Ohlmacher has recently published observations showing that in a number of cases at all events enlargement of the lymph glands exists (the so-called status lymphaticus) and often there is persistence of the thymus gland. That these conditions exist in otherwise inexplicable sudden death has long been known and the relation seems, if not proven, at least possible. What seems to be needed at present is the careful working over of pathological material and particularly a careful study along the lines laid down by Nissl, Macallum, and others, of the chemico-pathological changes which are associated with the conditions of nervous disturbance.

In my own laboratory, although a number of observations have been made in this direction, we do not so far feel prepared to communicate the results, as we do not feel that we have yet gotten at the bottom of the personal equation. It seems in this line of work in particular very difficult to compare the results of one observer with those of another. We have been able to confirm in a general way the views of Ewing and Goldscheider as to which changes are due to artefact conditions and which ones indicate general systemic disturbance. Our opinion as to the conditions of the nerve cells in shock must be reserved for further consideration.

On the whole it may be stated with considerable confidence that minute anatomical intracellular changes of some sort underlie the conditions of shock encountered in railway surgery. It is probable, too, that limited lesions of minute dimensions due to hæmorrhage, etc., are more common than has hitherto been supposed and the marked increase in the number of cases of syringomyelia which have come to light since attention has been directed to their occurrence makes the assumption of purely functional explanations less and less tenable for the majority of cases.

I may add a word or two as to the pathological conditions which justify us in assuming shock as the cause of death. We should insist upon all the causes including hæmorrhage being rigorously excluded, and establish a complete and thorough autopsy, noting the absence of gross anatomical lesions of vital organs as well as the absence of conditions such as fat embolism or fatty degeneration recognizable only by misroscopic examination.

VARIETIES AND CAUSES OF SHOCK.*

By H. L. Getz, M. D., Marshalltown, Ia.

The usual use of the word "shock" is in connection with traumatism of lesser or greater extent or degree. Considering the frequency of the occurrence of the condition regarded as shock, one finds the literature on the subject rather limited in many of the text-books on surgery, at least, so far as pertains to etiology, varieties and causes. Most of the authors of surgical publications content themselves with a few suggestions on the mode of treatment, universally referring to the loss of blood as a cause of shock. Could it be regarded as death resulting from shock if an individual perish from severe loss of blood resulting from a severed vessel? No! certainly not. Hemorrhage in connection with a traumatism should and may not be properly regarded as a factor in producing shock per se. While a fatality may follow as the result of shock where the person has lost a considerable amount of blood, more often or readily than where there has been no hemorrhage, yet the part the loss of blood bears in causing death should and cannot be properly regarded as having in any way increased the condition properly known as shock, although it was and should be regarded as having been a factor in causing death. For instance, an individual is, figuratively speaking, or may be so in fact, half bled to death; he has also sustained shock which would half kill him. He died from hemorrhage and shock in equal proportion and not from shock increased by hemorrhage.

Properly, it seems to me, there are but three varieties of shock: First and most common is that form which should be designated as reflected; second, mental; and third, direct shock. The first of these is found as the result of injuries of the extremities or other portions of the body not involving the brain, but reflected to it through the nerves of sensation.

The second is the result of imagination, fear, or grief (in which there is absolutely no traumatism), impressing the nerve-current generating elements of the brain through the faculty of intelligence.

The third, or direct, occurs as the result of concussion or direct injury to the nerve center or nerve-current generating elements, directly deadening or paralyzing without appreciation or realization on the part of the individual, and this without physical evidence of injury existing, at least to occular inspection. The thought occurs here that if we were without nerves of sensibility, and without realization of pain—without sympathy, without fear of being or seeing others injured—we would have but one form of shock, namely, the direct.

The child not yet old enough to realize danger and the individual thoroughly intoxicated alike suffer less from reflected shock, all things equal, than is the case with the individual who realizes danger. That all varieties of shock with which we come in contact except the direct form emanate from the nerve-current generating neuron, to which impressions of pain, sympathy or fear have been reflected, can scarcely be questioned or doubted.

The three varieties of shock as just enumerated may properly be classed under:

First, functional shock, the result of reflected impression upon the neuron and so resulting in a temporarily arrested nerve current. Under this class are embodied the first and second variety already mentioned. Under the second, organic shock, where actual traumatic injury is done to neuron cells, which injury, while not necessarily being sufficiently severe to be discoverable even by a microscope, yet may, and no doubt does exist, and such condition, when not amounting to actual destruction or visible traumatism, will in many instances recuperate and the function be gradually restored.

The difference in effect between the involvement of the brain in mental and reflected shock—functional and direct-organic shock—is one which cannot always be measured or estimated to an absolutely positive nicety or degree. The effect of functional shock, the result of pain, fear or grief, may, on the one hand, be so severe that the physiological disturbances simulate existence of traumatic neuron conditions, while on the other hand, direct traumatic organic shock may be of a degree so slight that the mental or reflected functional effects or symptoms only are manifest. The type of shock with which we have to deal in a given case may perhaps be best and most accurately determined through close investi-

* Read in the Symposium on Shock, Toronto, 1898.

gation of the cause of the shock existing in each particular case.

It is important to the surgeon and patient that we ascertain as nearly as possible the type of shock existing, so that the treatment may be the most intelligent. It is equally important that we differentiate between the state of the patient due to shock proper and the condition due to much loss of blood, and also the condition due in part to loss of blood and shock proper, of either type. Reflected, the result of pain, fear or grief; mental, functional, and direct, traumatic organic. The use of intravenous or extravenous injections of fluid of whatsoever kind employed in shock where no material amount of blood was lost would not only be valueless, but possibly actually injurious to the patient, while the failure to resort to such means of restoration where there has been much loss of blood, complicating by exhaustion, shock proper—might certainly be the cause of a fatal termination of the case. Therefore the importance of differentiating in cause and variety of type of shock.

It is, however, not my province to discuss treatment of shock, therefore I must digress no farther. I have thus briefly called attention to the varieties of shock, making, I believe, a simple and intelligent classification, and expect the discussion will be strong in criticism and approval. "Doctors differ," it is said, and I presume it is and will be so on this subject, concerning which we know so little about, at least, of a positive nature. The most we really know about it is that patients so afflicted not infrequently, in spite of all well directed efforts, die, and that they sometimes recover. Most often we find the recovery in purely mental reflected shock, the result of fear or grief; next in reflected traumatic; and last and least often in direct, traumatic or organic.

In defining the varieties of shock I have necessarily alluded occasionally to the "Causes of Shock." My paper, however, would perhaps not be regarded as complete were I to drop the subject without some further discussion of the "Causes of Shock."

Chief among the causes are crushing injuries and most often encountered as the result of accident caused by heavy machinery. As railway surgeons we find it most often occurring on railroads. A similar state of affairs is encountered by the general surgeon in injuries caused in the various factories, and in fact it is encountered in accidents of all classes in certain individuals and under certain circumstances. There is no doubt but that some persons are so constituted that shock is as certain to follow as there can be certainty of anything, even death, if an accident of even slight degree occurs to them, and in some even without the existence of a trauma of any kind. The nerve current or fluid, or call it what you may, is in some individuals doubtless much more easily disturbed than in others.

I quote here from an article but recently contributed by Dr. Branly to "La Nature" of May 28th, which I believe will prove of material aid to our understanding and comprehension of the nature of "shock," and also, perhaps, a more intelligent and satisfactory treatment of the same:

"Progress made in one branch of science often throws light on obscure points in entirely different branches. Thus it is that the so-called radio-conductors in electricity seem likely to aid us in understanding the phenomena of nervous currents.

"Nerve currents have long been compared to the electric currents that circulate in metallic wires. This analogy became inadmissible after the discovery that the nerve elements are anatomatically discontinuous; but it has been re-established by the knowledge of the method of propagation of electricity in discontinuous conductors.

"Radio-conductors and discontinuous substances, consisting of metallic particles in an insulating medium, the quantity of insulating material being very small. They are insulators under ordinary circumstances, but become conductors under various electric influences, as when a spark is caused to pass in their neighborhood, even at a considerable distance, or when a condenser or transformer discharge or a current from a battery of numerous cells is passed directly through them. This conductivity often persists a very long time. Certain physical circumstances, such as a rise of temperature, and particularly a sudden shock, hasten the return of the insulating state. When conductivity has once been established and the return to a state of resistance has taken place, an action weaker than at first is sufficient to re-establish conductivity.

"There is no sharp distinction between continuous and discontinuous conductors; the discontinuous conductor of separate particles in an insulating medium is the type of all

conductors. In a metallic block, compression has greatly reduced the insulating medium that surrounds each grain. In substances that are visibly discontinuous, insulating matter keeps the conducting particles clearly separate, and when the insulator is in a sufficient proportion, the increase of conductivity, instead of lasting some time, disappears immediately after being caused, while with a yet greater quantity of insulators finite conductivity no longer appears, even with the direct application of violent discharges.

"The nervous system is made up of 'neurons,' or independent elements not fastened together, and connected only by their branched extremities, and by contiguity, not continuity. The nerve current is stopped when this contiguity ceases. Its passage occurs again whenever the force of the current is increased or whenever the contiguity of the extremities of the neurons becomes more perfect. Is this continuity at the extremities the only kind, or can the constituent particles of each nervous conductor also offer—at least in pathologic states—a form of discontinuity that makes the passage of the nerve current more difficult?

"Certain nerve phenomena are analogous to the phenomena of radio-conductors. Just as a shock weakens or even stops the conductivity of radio-conductors, so a wound may produce anæsthesia and paralysis, due to a suppression of the nerve current, and consequently to a defect in the contiguity of the nerve-elements.

"On the other hand, just as the oscillations of the electric discharges establish the conductivity of radio-conductors, so we see that these discharges act most effectively in the cure of anæsthesia and hysterical paralysis. The parallelism between the effects of shock and of electric sparks on radio-conductors and on the nervous system in hysteria extends also to its susceptibility to feeble action after a powerful action has produced a primary effect.

"Discharges of high frequency are eminently fitted to make radio-conductors conductive, and we see also, according to the observations of D'Arsonval and Apostoli, that they exert a curative effect on affections due to retardation of nutrition. If these affections can be attributed to imperfect transmission of the nervous current, we are justified in supposing that the discharges act by re-establishing between the nerve-elements a contiguity that has become insufficient.

"If we compare the propagation of a nerve-wave in the nervous system to the propagation of the electric current in a radio-conductor, we may assert that a neuron behaves like a metallic particle. In the case in which the intervals that separate the extremities of two contiguous neurons cannot be crossed, because they are too wide, or because the nerve-current is not strong enough, an electric discharge will re-establish the broken communication, and this communication will remain for some time. The therapeutic rôle of electricity can thus be explained. It would not be substantially altered if it should be found that not only the extremities of the neurons, but the elements of a simple nervous conductor were themselves too far apart to transmit a nerve-wave.

"The facts seem to me to be important enough to form the basis for hypotheses and experiments from which electro-therapeutics cannot fail to receive much benefit."

It is not probable that the effect upon the brain (in cases where shock is manifest) differs where the condition is the result of a very painful trauma of an extremity from that which would be found to exist as the result of violent grief or fear. In the first instance the pain is reflected to the current generating portion of the brain from the injury remotely located.

In the second instance, under causes of shock from fear or grief, the impression is most likely reflected from the intelligence center (sympathy) of the brain to the seat of generation of nerve current. In the instance of direct, traumatic, organic injury to the neurons or centers of generation of nerve current, the senses may be at once so completely effaced that reflected causes of shock are and cannot in any way be a factor in producing the condition under discussion.

The remote causes of shock under the first head may be enumerated under, first, trauma with existing pain; second, fear, and third, grief, embodied under causes of functional shock. These become immediate causes by reflection to the nerve current generating neuron, which, through the reflection, is temporarily paralyzed to a greater or lesser degree, which under these conditions is not capable of generating sufficient quantity of degree of nerve current to overcome the increased resistance (resulting from traumatic or sympathetic causes) of the nerve courses or conductors. This resistance, according to Dr. Branly, is perhaps largely due to the arrangement of contiguity of minor neurons, therefore increasing resistance materially over that which would be encountered in a conductor of continuity of substance. Through this deficient generation and imperfectly distributed nerve current or force, we have the result-

ing impaired function of some or all of the most important organs and several parts of the body.

Typical shock: Under the second head we have direct, traumatic or organic shock. We have no conditions of reflection, the paralysis or inability being due to direct injury through concussion or compression of the nerve current generating neuron and actually injured nerve current conductors. Recovery or death from any of the causes enumerated will depend largely upon the extent of derangement of the nerve current generating structures and conductors as well as upon existing complications such as hæmorrhage; the treatment of the patient may also be made to amount to a complication in the case, unless the keenest scrutiny be applied in determining the cause and kind of shock, and the use of the most clever judgment in the indications for treatment. Inasmuch as the condition known as shock results from all classes and kinds of injuries from the simple pinch or contusion of a finger tip, to the most extensive and complicated injury resulting from the many possible sources of injury, machinery of all kinds, designed injury-producing devices and the many miscellaneous sources, too numerous to name, I have not deemed it necessary to refer by item to all sources of what may be termed the remote causes of shock.

SYMPTOMATOLOGY, DIAGNOSIS AND PROGNOSIS OF SHOCK.*

By S. R. Miller, M. D., of Knoxville, Tenn.

The proper management of all pathological conditions depends most of all upon a correct diagnosis. This can be determined only by a proper recognition of the symptoms. A few symptoms in each case are often sufficient and the physician or surgeon learns to rely upn these. Occasionally one pathogonomic symptom will fix the diagnosis. More frequently, however, the whole group of symptoms is necessary, and even then it may be with great difficulty that a satisfactory diagnosis is reached.

In shock the symptoms vary according to the age and temperament of the individual, the character of the injury and the circumstances surrounding the accident. Why age, temperament and mental conditions cause such variations in the character and intensity of the symptoms we cannot explain. Serious cases of shock not infrequently present a large group of characteristic symptoms and even the laity may recognize them. On the other extreme, however, the symptoms may be of such nature that even the most experienced surgeon can make only a probable diagnosis. Between these two extremes will be found the large majority of cases that the railroad surgeon is called to treat.

We will review briefly the symptoms usually found in uncomplicated cases of shock as a result of trauma.

The first to be noticed is mental hebetude. This may be trivial and transient or of the most profound character. The latter state may resemble death and does sometimes pass into death with but little perceptible change. Usually the mind can be aroused by special effort, but the thoughts cannot be fixed or retained for any period. The sensibility is blunted and the tone of the voluntary muscles is diminished or lost. The patient is quiet and lies in any position in which he is placed or that gravity causes him to assume. The countenance presents a decided change. It seems to have become smaller. The skin and mucous membrane is almost bloodless, and there is a characteristic pinched expression of the face, particularly about the nose. The eyes have lost their lustre, the pupils are usually dilated, and the lids are partially or entirely closed and there is a low oscillatory motion of the eyes. The mucous membrane and nails are purplish. The skin is pale and livid and frequently bathed in a cold, clammy perspiration. The entire surface is cold and the body temperature is sub-normal. The heart's action is the symptom largely relied upon by many surgeons. This is usually rapid and irregular. The first sound of the heart is sharper, and the second sound is more indistinct than normal. The pulse is weak and sometimes imperceptible, and the tension is low. The respirations are shallow and irregular. Occasionally there is a deeper, sighing respiration, which is followed by one shallow or almost suspended. The secretion of urine is diminished or suspended and usually there is retention. The action of the stomach

*Read in the Symposium on Shock, Toronto, 1898.

is also impaired or suspended. These symptoms, with their different degrees of intensity, give us the clinical picture of shock.

Another form of shock, however, is not infrequently seen. In this form, instead of the stupor, there is excitement. All symptoms, excepting those of the nervous system, are practically the same as those named in the above form. The mind is apparently clear, but is beyond the patient's control; no suggestion, encouragement or entreaties have any influence upon him. He tosses from side to side, regardless of his injured limb or part, but complains of no particular pain, though there is an awful anguish and restlessness that is unendurable. He may cry or scream in an unintelligible manner until completely exhausted. This form may be present from the beginning or may take the place of the first. With the use of an anodyne this excited condition usually passes into one of stupor.

But all cases of shock are not typical. The railroad surgeon is often confronted with serious and complicated cases in individuals of whose physical powers and peculiarities he knows little or nothing. It is such cases as these that gives the surgeon greatest concern. It is to these, and particularly their differential diagnosis that I wish to direct your attention.

The symptoms of shock and hæmorrhage are so nearly alike that the best skill sometimes fails to differentiate them. That shock does follow as a result of hæmorrhage, I think no one should doubt. It is equally true that reaction may cause a recurrence of hæmorrhage. The treatment of these two conditions are often the reverse, as no doubt will be set forth by the essayist on treatment. It is, therefore, imperative that a speedy and an accurate diagnosis be made in these cases. In injuries to the extremities, with a clear history of the accident and symptoms it is sometimes impossible to determine to which of the two conditions the symptoms should be accredited, but in no class of injuries does the surgeon experience greater difficulty in making a differential diagnosis than in trauma of the abdominal contents. A light blow upon any viscus, and particularly the solar plexus, may result in profound shock. Likewise a slight contusion may rupture the liver, spleen or hollow viscera and serious and even fatal hæmorrhage may follow. Shock, per se, may not follow as an immediate result of such injuries. Therefore we must conclude that the history of the injury gives us no valuable aid in determining the diagnosis.

The fact that shock to greater or less degree usually follows hæmorrhage is prone to mislead the surgeon, if serious visible injuries are present and no external evidence of injury of the viscus. The point of greatest diagnostic value, perhaps, is the history of the beginning of the symptoms and their course. The symptoms of shock are immediate or nearly so in their appearance. Those of hæmorrhage are usually later in appearance and more progressive in character.

In both shock and hæmorrhage there is pallor. In the latter it is a waxy pallor, while in the former it is a livid hue. This difference, slight as it is, may be one of great value to the experienced surgeon. In hæmorrhage there is not infrequently marked vomiting, but in shock this rarely occurs, except in the stage of reaction. In hæmorrhage the second sound of the heart is almost or quite inaudible. In shock the variations from the normal are not so great. These are the cardinal symptoms usually observed in cases of shock and from which the surgeon makes his diagnosis.

The writer has observed a number of cases with a different character of pulse from that usually accredited to shock. Sometimes the pulse has remained normal or nearly so in frequency, but the heart's action has been stronger. The tension was nearly normal. This is explained upon the theory that shock is due to hyper-irritation of the vaso-motor nerves, and in this case the depressor fibres receive a greater proportion of stimulation than the accelerator division. It has been the writer's experience to observe a few cases of serious injury to the liver with almost a normal pulse. In one case of extensive rupture of the left lobe with dislodgement of a part of the liver structure, the pulse was below ninety and full and regular. Other cases of less serious, but similar character, have been carefully observed. Whether this was a mere coincidence or whether there is a physiological reason for such symptoms must be determined later. They can be explained as the writer attempted to do in a paper presented before the last annual meeting of the Associa-

tion of Southern Railway Surgeons, upon the hypothesis above named. The irritation to the splanchnic vessels drives the blood into the somatic division and thereby counteracts the usual irritation exhibited in the pulse. I have no desire to encroach upon the rights of the essayist on pathology, but merely to give to these symptoms the prominence they deserve.

Many cases of so-called delayed shock would, upon careful investigation, be found to be shock plus hæmorrhage, or possibly hæmorrhage plus shock. Each case of delayed reaction demands careful examination for hæmorrhage, concealed or otherwise. Shock is the waste basket in which many surgeons dispose of doubtful and sometimes incorrectly diagnosed cases.

The prognosis of serious cases of shock is always grave. Cases that are considered almost hopeless may react quickest and best. On the other extreme, less serious cases occasionally terminate fatally. Much depends upon the temperament of the individual and upon the optimistic or pessimistic view that he himself takes of his case. It is the writer's experience that those who are hopeful respond best to treatment, and it sometimes occurs that the patient who looks upon his case as one almost surely fatal, dies apparently without sufficient cause. The surroundings of the patient at the time of the injury and immediately thereafter also have some influence upon the prognosis.

Young and middle-aged adults bear shock best; children do not endure serious shock so well. The aged seem to have the least endurance. The greater the age, all things else being equal, the less is the individual power to resist and recover from shock. The prognosis in all serious cases of shock should be guarded, but the case never abandoned.

In gunshot wounds where the bullet has remained in the tissues, it is better to consider how safely it can be allowed to remain in position, than what risks we are justified in taking for its removal. The indications for extraction comprise the ease with which it may be done, as well as the interference with the functions and integrity of important structures which the bullet may bring about.—Int. J. Surg.

PREVENTION OF SHOCK.*

By Hugh M. Taylor, M. D., Richmond, Va.
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In order to facilitate the discussion of this phase of the subject, it would be well to notice

First, Shock induced by mental impression.

Second, Shock incident to trauma, i. e., fractures, dislocations and extensive contusions and lacerations.

Third, The preventive measures indicated prior to, during, and subsequent to an operation.

1. While we must admit our inability to prevent the mental impression which culminates in profound shock, and takes in the so-called traumatic hysteria or neurasthenia, I would urge that it may be within the surgeon's power to limit the degree and duration of psychical shock. Just as we educate the non-traumatic neurasthenics to realize that they are not hopelessly sick, and finally that they are well, in like manner, I believe, we can certainly, in some instances, by words of encouragement, remove the idea in the minds of the injured that the injury is serious or lasting. This idea is probably common experience, and its emphasis out of place; but since appreciating it fully, I am more and more of the opinion that I have lessened suffering and in railroad cases especially have sent men back to their work earlier and have possibly avoided some troublesome suits for damages.

2. In the prevention of shock incident to trauma, our efforts must largely be directed to limiting the extent and duration of shock. Notably the railway surgeon usually finds his patient shocked when he first sees him, and his interest is largely focused in limiting existing shock, and in preventing added shock.

3. The inquiry naturally arises what are the preventive measures at our command available in traumatic cases to limit shock, to prevent its increase and continuation?

Assuming that mental disquietude, pain, hæmorrhage and sepsis are the most important etiological factors in inducing shock, it seems most important to reassure the alarmed patient, relieve pain, prevent hæmorrhage, or remedy its consequences, and to guard against

* Read in the Symposium on Shock, Toronto, 1898.

sepsis. Words of encouragement are, I am sure, potent for good. I would also impress the benefit incident to the timely administration of morphia to relieve the pain. Morphia does good, not only by relieving pain (an important factor in inducing shock), but I also regard morphia as one of the best of heart tonics. We all recognize the fact that the anodyne effect of morphia is not indicated in all cases, as pain is not by any means always severe in proportion to the gravity of the injury. I have often seen mashed fingers attended by excruciating pain and profound shock, while in some cases of a penetrating wound of the abdomen, even with visceral lesions, there may be little pain, and, in some instances, no shock.

Some of the speakers have disapproved of the tendency to confuse the effects of hæmorrhage with those of shock. For my own part, I think the conditions, i. e., the effects of shock and hæmorrhage, are so closely related that they should be considered together. I believe we could claim to have shock in all cases of profuse hæmorrhage—i. e., the shock of hæmorrhage, and possibly hæmorrhage in all cases of profound shock—this last being true if we admit that in shock and vaso-motor paresis we have the blood accumulating in the pelvic and abdominal vessels—the patient bleeding even to death into his own blood-vessels. I certainly could not agree with some of the previous speakers who failed to recognize that in hæmorrhage we have a most important and frequent cause of shock. The shock of hæmorrhage is just as much shock as the shock incident to depressed fractures, or that from a ptomain poison from any source. The symptoms of shock and those of hæmorrhage are the same, and there are no clinical features by which we may tell the syncope of shock from that due to hæmorrhage, and no changes other than those ocular demonstrations by which we can differentiate the effects of shock from those of hæmorrhage.

Shock, syncope and collapse are terms which I have long used synonymously, and each represents to me the condition of shock. To claim that the depression incident to hæmorrhage is collapse or syncope and not shock is, to my mind, a distinction without a difference, and as such is misleading and unfortunate. I would urge that the most important mission of the surgeon is to secure hæmostasis, and prevent or remedy its inevitable sequela—shock. Shock without hæmorrhage is common; but hæmorrhage without the shock of hæmorrhage is rare; and in minimizing hæmorrhage, I believe we prevent shock and limit its intensity and duration. While the contused and lacerated wounds—the type met with so frequently by railway surgeons—do not, as a rule, bleed profusely, I would ask if there are not many exceptions to this rule? And is it not a fact that not infrequently the patient has bled to syncope before he is seen by the surgeon, and that shock—nature's most potent hæmostatic—has checked the bleeding? Often there is no bleeding at the time when the patient is first seen, but he is shocked; and it is eminently undesirable that shock should be added to shock by even a limited continued bleeding.

While not wishing to consider the technique best adapted to secure hæmostasis and remove its consequences, as a matter of experience, I can endorse most emphatically the value of normal saline solution administered per rectum, subcutaneously, or directly into the vein. It is the remedy in which I have the greatest confidence, and have used it freely and satisfactorily in the shock incident to trauma, hæmorrhage, and in cases of post-operative traumatic and puerperal sepsis. In connection with the use of saline transfusion after trauma, I may recall the fact that the saline will pour out of open blood vessels almost as fast as we can introduce it into the circulation; and, therefore, in conjunction with its exhibition, we must close up vessels from which it could escape.

As an illustration, in a compound fracture of the skull with profound shock, the saline solution introduced into a vein in the arm immediately poured out of the skull wound, through a torn longitudinal sinus. Of course the patient was not benefited by transfusion. In another instance, a patient with his leg crushed off had also a torn perineum. Profound shock existed and transfusion direct was at once practiced. A tourniquet on the mangled leg sufficed at that point, but in spite of tight packing of the wound in the perineum with gauze, in a few minutes the saline solution was found puddled between the patient's thighs, and, of course, no benefit was derived.

Another point in connection with the use of saline transfusion which I think I have observed sufficiently often to warrant mentioning, is that the free use of saline transfusion—post-traumatic or post-operative—increases the amount of discharge from wounds. I have specially noticed this increase in connection with drainage after intra-abdominal operations, and it may be of service in diluting septic material and in flushing septic areas which we wish to drain. The effects of interest and value incident to saline transfusion is its power to relieve thirst, to stimulate the action of the kidneys, skin and bowels, and the elimination of ptomainic and other poisons.

It has often been with me a nice point to decide when to operate during shock to arrest hæmorrhage or to prevent its recurrence with the advent of reaction. In my experience, instances are not frequent when operative interference was imperative to arrest hæmorrhage, and increasing or recurring shock incident to hæmorrhage.

Very recently I have met with two cases which fully illustrated this point. One was a penetrating pistol wound of the abdomen, with visceral lesion in the shape of a perforation of the stomach and liver. An hour after the injury there was but little if any appreciable shock. Three hours after, in spite of active preventive treatment, the patient was collapsed —shocked presumably from intra-abdominal bleeding. A section revealed the lesions mentioned, as also free intra-abdominal hæmorrhage. A second case occurred in connection with a celiotomy for pyosalpinx and adherent appendix. The patient was put to bed in apparently good condition. An hour subsequently the patient's pulse was 110; in two hours it was 130, and accompanied by the usual manifestations of profound shock. On reopening the abdomen, free hæmorrhage was found to have taken place from a tear in the broad ligament.

One of the most perplexing problems we are called upon to solve, especially in abdominal and thoracic injuries, is to decide whether the shock is due to trauma per se, or to trauma plus intra-abdominal or intra-thoracic bleeding. While in hæmorrhage we should have the symptoms of shock plus the pressure symptoms of accumulated blood, I doubt if many could appreciate the pressure symptoms by the physical signs early enough to be of service. The differentiation is best made, according to my observations, by remembering that shock is, as a rule, immediate in its outset, and reaches its acme at once; and, in the absence of a continued causative influence, is not progressive or lasting beyond reasonable limits.

The shock, syncope or collapse from hæmorrhage is slower in its onset, often begins with reaction from the primary shock, and is progressive or recurring in character.

In connection with the prevention of shock, we might well consider the advantages and disadvantages incident to transporting patients to hospitals while suffering from shock. Added pain, continued bleeding, and the danger of infection through cutaneous or visceral wounds are prominent among the disadvantages of removing injured patients. The strangulated hernia, the mangled limb, depressed skull, and torn abdominal viscera had often, I believe, best be operated upon at once, and, if need be, sent to the hospital for subsequent treatment.

What can we do to prevent shock if we have time to prepare the patient for the operation? When such opportunity is afforded, I am satisfied that a great deal could be done to prevent shock. Whenever possible, the preparation of a patient for a major operation should begin several days prior to the time fixed for the operation. If the patient is to go to the hospital it is a decided advantage to have the patient in the hospital for at least forty-eight hours prior to the operation. Few patients unaccustomed to hospital life rest quietly for the first few nights of their sojourn in the hospital, while in a few days they get used to their surroundings, nurses, etc.

Whether the operation is to be performed at home or in a hospital, the surgeon can usually profitably occupy several days in ascertaining the weak points in his patient's physique and in doing all in his power to improve the resistance of individual organs and of the organism as a whole. Many a post-operative crisis is, I am convinced, successfully passed by the careful preparation given prior to the operation. Notably the morale of the patient should be encouraged. The patient who goes to the operation, full of courage as to the result, confident of recovery, freedom from pain and restored usefulness, is probably in a

better condition to make a post-operative fight. All of the organs should be put in their best possible working order, but special attention should be given the kidneys, skin, and gastro-intestinal organs, which may be considered the great sewers of the body. It is my unvarying custom to flush out the kidneys and the bowels. The patients are encouraged to drink freely of water, and in order to secure this end I not infrequently prescribe a lithia tablet in a glass of water at prescribed intervals. Purgatives are given and intestinal antiseptics and fluid diet are prescribed with strychnia for several days prior to the operation. If necessary, sleep is secured by giving some simple hypnotic, preferably sulfonal, especially when preparing for an abdominal section; and after alvine discharges have been secured by saline purgatives, I give just before the operation a pint of saline solution by the rectum. Not infrequently I give mild purgative pills just before the anæsthetic is begun.

I am careful to see that the operating room is warmed and that warm, dry clothing surrounds the patient. I do not like for the anæsthetizer to begin the anæsthetic until the preparation of the patient for the operation is well advanced. We often hear, without heeding it as we should, I fear, the truism "as well club a patient with a sand-bag as to shock him by too much or too prolonged anæsthesia." Too profound or too prolonged anæsthesia induces shock. It is not unreasonable to claim that too little may be equally a factor in producing shock, i. e., not enough to eliminate consciousness of pain. In any event, we claim that the judicious exhibition of the anæsthetic is important in the matter of preventing shock. I know of no greater comfort to the operator than an intelligent anæsthetizer—one who knows when to push the anæsthetic and when to let up with it.

I seek to guard against shock during an operation by working as rapidly as is consistent with the completeness, and especially completeness in limiting the loss of blood during the operation. I require to be at hand ready for immediate use during an operation, strychnia, digitalis, caffein, nitro-glycerin, saline solution, etc.; and I am anxious to anticipate shock in the use of these remedies rather than to trust to them after shock has well set in. If the abdomen is open, hot saline is much depended upon in shock. I think it should be a part of the duty of the anæsthetizer to watch for shock and to apply appropriate remedies. Rapid surgery is not always complete surgery; and while I would not urge celerity at the expense of thoroughness, I regret a failure to grasp and act upon emergencies promptly as they arise. Complete surgery limits primary and reactionary hæmorrhage and prevents shock. Complete surgery wards off septic infection and the most dangerous of all shock —that incident to rapid ptomain absorption.

No time should be lost in getting the patient back to bed after the operation, as each half hour consumed in operation and dressing of the patient adds to the degree and danger of shock. Dress dry and warm the patient, as quickly as possible. I usually order a pint of hot saline solution and an ounce of whiskey to be given by enema as soon as the patient is in bed. I consider it all-important to dry the patient by friction with dry towels or the hand. Hot water bags are useful but must be watched so as not to act as a hot pack or burn the patient. If reaction is not prompt, treatment is continued by administering saline solution under the skin, by the rectum, or by direct transfusion, if the case is urgent. I have not practiced it, but am inclined to think well of the practice of filling the abdomen with saline solution just before closing it. Strychnia, digitalis, caffein, nitro-glycerin, atropin, and morphia are administered, at intervals, as indicated, and cold tea and coffee may be given with advantage by the rectum. My experience impresses the conviction that patients treated along this line will, with few exceptions, recover from shock which is uncomplicated. I do not believe in the so-called prolonged shock, delayed shock, etc., in such cases; I think we have shock plus hæmorrhage or the ptomain shock incident to rapid sepsis, and in exceptional instances, fat embolism or venous thrombosis to contend with. In shock, hæmorrhage and sepsis, I recognize the trinity of dangers common to traumas and surgical interference; and their prevention secures against diminished læcal and septic resistance.

Gauze soaked in 3 to 5 per cent. warm carbolic acid solution makes a most soothing and efficient poultice.

THE PREVENTION AND TREATMENT OF SHOCK.*

By JAMES H. LETCHER, M. D., of HENDERSON, KY.

In the subject now under discussion, it will require but a short time for me to report upon that portion assigned me, viz., "The Prevention and Treatment of Shock." In both its prevention and treatment it is well to remember that much depends upon the personal equation of the individual, and that all patients should be in the recumbent posture, and, if need be, the head lowered.

If time will permit before resorting to a surgical procedure of any gravity, to prevent shock, prepare your patient carefully for the operation he is to undergo, by putting him in as healthy condition as possible, and for its sedative effect on the nervous system, keep him in bed several days prior to the operation. Regulate his secretions, and if living in a malarial district, cinchonize him forty-eight hours beforehand. It is well for the patient to early understand the gravity of the steps to be taken, and the possible outcome, and especially should his family or friends know all this fully, but after that, every mention of his case should be full of hope and confidence of good results. He should have an unshaken faith in the skill of his surgeon, and the competency and watchful care of his nurses. Do not allow him to know beforehand the day or hour of the operation, nor permit him to see any of the instruments or paraphernalia to be used, bearing in mind that the mental aspect is an important factor in the production, as well as in the maintenance of shock, especially of psychical shock.

Anæsthetize him while in the bed he occupies, and if he is very nervous or weak, give him beforehand, and in such a way that he will not attach any great importance to it, an opiate, or sulphate of strychnia, hypodermatically, or a dose of quinine per os. It has been suggested that a very nervous patient be first put to sleep by a hypodermic opiate, and then anæsthetized while sleeping, but I have had no occasion to practice this method. Give your patient barely enough of the anæsthetic to answer the purpose (but give enough), allowing him to remain under its influence as short a while as possible, by being ready to operate the moment he is anæsthetized, and operating as rapidly as is consistent with safeness. Prolonged operation and profound and continued anæsthesia vastly increase the danger from shock. Make yourself feel comfortable by having a safe man to administer the anæsthetic, and have, as I do in my hospital operating room, nitrite of amyl pearls, hypodermic tablets of nitro-glycerine, strychnia, atropine and morphia, some whisky or brandy, hot saline solution, and perhaps a galvanic battery, all ready for use if needed. If the case is at all serious, I have a hypodermic syringe already charged with nitro-glycerine and another with strychnia sulphate.

Keep the patient warm and dry by having your operating room warm, his limbs and body protected by warm flannels, no wet towels or fluids being allowed to remain in contact with him, for chilling the person by evaporation is dangerous, and the preservation of animal heat desirable. Handle the viscera—especially the ovaries and testicles—and the injured parts, gently, avoid all unnecessary bruising of tissues, and control every particle of hæmorrhage. If his condition is critical, get him in bed between blankets, the top blanket not being too heavy, without consuming time in arranging a nice, attractive-looking dressing.

If you see a patient with a torn and crushed limb, until ready for operation, examine him in the most careful and delicate manner, and just enough to find out what is necessary for immediate treatment, control hæmorrhage, put him in a comfortable position, keep him quiet and warm, protect the wounds from atmospheric influence, without a studied and painful attempt to antisepticise them; speak words of cheer and comfort, and thus possibly prevent shock.

But little will be said concerning the management of shock after it is once established. It is my opinion that a large number of lives have been and are still being lost by its injudicious treatment; aye, not only has death been made certain, but its coming has been hastened by the medical attendant. And how can this be? Simply by doing too much or too little, more particularly the former, for in many cases a great deal is done that should be left undone.

*Read in the Symposium on Shock, Toronto, 1898.

I do not believe that I go beyond the limit of my subject when I suggest in the treatment of shock the wisdom of making a clear distinction between shock and hæmorrhage; for while they have symptoms in common, and in some cases each accompanies the other, there is a vast difference in their pathologic condition, and hence should be in their treatment. So also in surgical procedures it is well to recognize shock from the effects of anæsthetics, or from sepsis.

The effects of an opiate, not only as a curative, but as a prophylactic measure, is a happy one, and some form, preferably morphia sulphate hypodermatically, or codeine, because of its non-nauseating qualities, is a favorable treatment. Nitrite of amyl inhalations given at the first appearance of shock and nitroglycerine in 1-100 grain doses and repeated peated every hour or two for several doses, are indicated.

Hot water, with or without the addition of salt, is one of our most reliable remedies. It assists in driving the blood out into the general system, supplying the depleted blood vessels, and thus stimulating the kidneys, relieving thirst, etc. To be effective, throw the solution with a long tube, high up above the sigmoid flexure, until the colon is slightly distended, for in the latter condition absorption takes place most readily. Have the water as hot as can be comfortably borne and repeat the injection as often as the bowels will tolerate it. A far better method, and one in which I have never found the least trouble to follow, is to introduce the saline solution subcutaneously over the pectoral muscle or in the gluteal region. Several such injections of six to sixteen ounces each can be used in quick succession. If the case is very urgent and much blood has been lost, resort to the intravenous use of the salines at a temperature of 118 degrees to 120 degrees, as suggested by Dr. Dawbarn. If there has been much hæmorrhage one should not dare to withhold the saline solution.

Strychnia in my hands has proven one of the most effective agencies and can be given in what would ordinarily be considered tonic quantities. Doses of 1-60, 1-25 or 1-12 grain should be administered hypodermatically every three, two or one hour, and repeated several times as occasion requires. If there is any one remedy more reliable than all others, I think it is strychnia. Dry external heat, properly applied, is an excellent feature. Don't have the heat so intense as to over-stimulate the parts, but just enough to produce a gentle hyperæmic condition of the superficial arteries and arterioles. Heaters, as hot water in rubbers, or glass bottles, or stone jugs, or hot bricks, or smoothing irons, or gentle friction with dry mustard, or hot flannels around the abdomen, etc., are suitable methods of application.

When alcohol is given it should be in the form of whiskey or brandy, in small and oft repeated doses, preferably hot, but little diluted and without sugar. This is the remedy, above all others, used so recklessly in this condition by both the laity before the patient has reached the hands of the doctor, and afterwards occasionally by the doctor himself, that I think has killed so many suffering from shock. There has but recently been sent into my private hospital several cases of railroad injury, with shock, where I thought the gravity of their condition had been increased by the use of whiskey. In my hands usually alcohol proves one of the most valuable remedies. The aromatic spirits of ammonia in ten to thirty drop doses can be given with the whiskey. Some prefer carbonate of ammonia in five to seven grain doses, but it is more likely to produce gastric disturbance.

Digitalin in 1-60 grain doses or the tincture of digitalis in 12 to 15 drop doses, repeated at short intervals until two or three doses are taken; atropia sulphate, 1-100, 1-50 grain at a dose, especially if there is sweating, one grain doses of caffein or several ounces of strong black coffee; turpentine thrown into the rectum, inhalation of oxygen if readily obtained; sulphuric ether, one-half to one drachm at a dose, until four or six drachms are given, might be resorted to. Do not give the latter remedy if patient has been anæthetized with ether. The use of an Esmarch or roller bandage to the extremities (auto-transfusion) has been recommended, but one cannot expect as much good from such treatment in shock as in hæmorrhage.

As I said in speaking of the prevention of shock, the patient should be full of hope as to good results following the operation, so I would like to mention the importance of hope as a curative measure. Encourage and buoy up your patient by cheerful expressions of confidence in his recovery. Such words will prove to him the wisdom of Solomon's statement that, "A word fitly spoken is like apples of gold in pictures of silver."

When the case is urgent don't depend upon the absorptive powers of the stomach or rectum, but upon hypodermatic medication. As improvement takes place, gradually withdraw all remedies.

DISCUSSION.

Dr. W. B. Outten of St. Louis, Mo.: Mr. President: There is no subject with which the railway surgeon comes in contact that is of more importance to him than that of shock. There is no subject which makes him realize more fully in the process of attending to his business that every element has to be thoroughly considered, or else he has trouble in consequence. I maintain that as a general thing shock has to be considered under this head: It is a study of the idiosyncrasies of the individual from the beginning, and likewise of the injury inflicted upon the individual, and the only tale that can be told is by a careful physical examination. If we attempt to lay down rules in any particular case after an injury has been sustained, we make a mistake. We should study the conditions; we should try to find out all the elements that enter into the case, because some of them may be obscure, and we may have nothing that we are cognizant of. A man, for instance, may be struck in the solar plexus; at the same time, he may have a crushed limb, and as a consequence he is profoundly shocked. Anyone who has treated patients who have sustained violent railroad injuries realizes this fact, that when he examines the patient he will find that he has got various gradations to contend with in which shock is an element. He finds contracted capillaries, pallid skin, enfeeblement of the mental powers, a clammy sweat, retention of urine, and perhaps extrusion of feces, accompanying which there may be a very feeble pulse.

I maintain this as far as I have been able to discern from ordinary common-sense observation of cases, that I can see no difference, irrespective of what physiologists or scientific pathologists may say, between a case of profound shock and hæmorrhage. If a demonstration be made, one side of the heart will be found depleted of blood, while the other side will be engorged, this is essentially the condition in excessive hæmorrhage and shock. It is immaterial whether the sympathetic system is excited through the influence of the mental or physical shock, the cases all culminate in essentially the same condition, in that we have depletion on one side of the heart and engorgement on the other. We will meet with various phases of shock in which we will have to leave out unknown factors. We will find one man, for instance, who is profoundly influenced by shock from some fault entirely different from what we imagine, and when a careful examination is made, we may find that he has an organic lesion. We should bear in mind that some organ or organs may be at fault other than the injured ones, which we believe to be the cause of profound shock. In cases in which neurasthenia is inherited, or due, perhaps, to degeneracy, the tendencies are that in case of injury the shock is more profound in such an individual than in an individual who was healthy before he sustained the accident. I think we will find a more profound influence is produced upon a pure hysterical case than upon a case of neurasthenia. I likewise believe that in hysterical cases we have a more rapid response, while in a case of neurasthenia there is none.

Sir William Hingston of Montreal, Canada (by invitation): I have followed with great interest the papers that have been read on shock, but I have been disappointed to learn from the pathologists that they have discovered nothing new with reference to the pathology of this condition. I am very glad, however, that one question seems to be fairly, if not definitely, settled, namely, that hæmorrhage has nothing whatever to do with the matter. (Applause.)

With reference to the treatment of shock, common-sense tells us that physiological rest, quiet and encouragement are of vast importance. There comes a moment when it is necessary to change tactics. A person is injured severely; shock has been profound, but there comes a time when he recovers from the shock and sometimes he is the last to find it out. I have seen three cases of the kind in my own practice, one a very striking case.

A lady was injured on a railway, and one would suppose that she was shaken to pieces, because it is said she was confined to bed for four years, at the end of which time I saw her, she was unable to move or to turn over in bed. I arrived at her house during the night; examined her from head to foot and could find nothing. The shock, of course, had passed away long before this. I proposed that she be brought to Montreal, as I thought I could produce a greater impression upon her mind

there than I could do at her own home. I told the members of the family that if this was done I could promise recovery. The woman was brought to Montreal, and I resorted to this expedient: I got her into a room by herself and acted as if I was going to murder her. I took hold of her by the throat, and inside of twenty minutes she was walking around the city making purchases. Another case: A boy was struck in the epigastrium by a fellow swimmer, fell to the bottom of a canal, remained there for some time, and was fished out. A physician was sent for, and when he arrived the boy was apparently dead, the house was crowded with people. It was a hot summer evening when I went to see him on horseback; the boy did not seem to have any sign of life. I ordered the people out of the room, got my whip and gave him twelve or thirteen hard lashes over parts of the body where I was not liable to break any bones, and in a few moments he jumped up.

Those were two cases in which there was severe shock. In dealing with such cases, we have to take precautions, and we run the risk of failure. Your manner of dealing with or disposing of these cases is an enormous aid to railway companies in adjusting claims for damages. I think, as surgeons, you have an enormously important duty to perform in protecting railway companies against the rascality of such people. It requires great care and discrimination in the adjustment of claims or of accounts so that injustice shall not be done to either party.

Dr. Hugh M. Taylor of Richmond, Va.: I do not feel that I can add anything of particular interest to this discussion. Only a man who is brought constantly in contact with railway injuries can realize fully the importance of this subject. When I promised Dr. Ross that I would read a paper on the prevention of shock, I did not think of the great task I was undertaking. Since I have consented to say a few words on this subject, I have realized from the papers and the discussion that very little, if anything, can be said with reference to the prevention of shock. Personally, I have been unable to find anything of importance about it. Shock is met with under many different circumstances, and the surroundings of patients are different in many instances. The individuality of the patient is a large and important factor in the production of shock. We cannot discuss the prevention of shock intelligently without considering some of the conditions under which we meet with it.

It might me profitable to consider briefly the cases of shock we will have to contend with. We cannot prevent the mental impression that shock produces. It is a distressing condition, and distressing because of its immediate danger, and results in the production of neurotic disturbances which last for a long time. A patient is usually shocked when we see him. The idea occurred to me, and it is along the lines suggested in the papers, to some extent, how far has the surgeon in his power to prevent or to lessen the duration of surgical shock? In my daily work I put these patients to bed, and keep them there. On the other hand, I am conscious of the fact that many times a cure is brought about largely through encouragement given to the patient, rather than to medication. We can lessen, in some instances, possibly, the duration of shock by the manner in which we deal with our patients. Certainly, if we can lead a patient from a condition of evil foreboding into one of encouragement, encourage him to believe that he is not seriously hurt, his trouble will soon be over, and we can accomplish much in limiting the degree of shock, and in limiting its duration, thereby possibly preventing some law suits.

Traumatic shock, this is a form of shock that the railway surgeon meets with in everyday work, and he cannot prevent it. The patient is already shocked when we reach him. The duty of the railway surgeon does not lie in preventing shock, but in trying to limit the intensity of shock and its duration. Many factors have to be considered in limiting the degree of shock; there are three important ones which we should consider. The first is shock, the second hæmorrhage, and third sepsis. I cannot believe that hæmorrhage is not an important physiological factor in the production of shock. It occurs to me that one of the most important considerations in the matter of preventing shock is to limit the amount of hæmorrhage. Hæmorrhage has, in all probability, occurred before we get to the case; by limiting the hæmorrhage, we minimize the degree of shock. If we have time to prepare a patient for operative inter-

ference, of course we have a great advantage in the matter of preventing shock.

There is one question that has occurred to me, and that was brought out, namely, chloroform. We do not appreciate as fully as we should the truism, which is sufficiently often reiterated, with reference to profoundly shocking a patient with chloroform. Is it not possible that some degree of shock is produced by not giving enough chloroform to obtund sensibility and remove entirely pain? Too much chloroform undoubtedly does harm, and too little of it may possibly, in some instances, do good. To prolong the use of chloroform, as well as to give too much of it, is equally bad. As to prolonged shock, I am a little skeptical on that point to a considerable extent. My experience teaches me that prolonged shock in many instances means intra-abdominal bleeding, or else sepsis.

Dr. E. J. McOscar, of Fort Wayne, Ind.: I do not believe any surgeon present here has the power to prevent shock. I believe the only way he can prevent it is to see the patient before the injury has occurred, or before the emotional disturbance has occurred which is affecting him. Shock means violence, it is a bombardment of the nervous centers, sufficient in its force to cause disturbance, and these centers are practically Deweyized. It is a violence of the worst kind. When we find a person who is injured, and is shocked, we cannot prevent it. If a man, after an accident, walks to a telephone office, calls for an ambulance, or carries on business for two or three hours thereafter, he is not suffering from shock, but hæmorrhage. The hæmorrhage may not be external, but he is perhaps bleeding into his own tissues, and is suffering as a result of the hæmorrhage. It is not proper to weigh one condition against the other, either condition is certainly detrimental to the patient, and should be obviated as far as possible, we should not confuse shock and hæmorrhage. There is no rational reason for saying that shock means hæmorrhage, as some of our text-books do, and as many excellent men, whose opinions are exceedingly good along other lines, state. These two conditions can no more be linked together than we and Spain. (Applause.)

Dr. A. L. Fulton of Kansas City, Mo.: I wish first to speak of alcohol in connection with these papers that have been read on shock. I do not think it has been discussed, though the ground in other respects has been pretty well covered. As to the use of alcohol, I want to ask any man what he employs it for in profound shock, except to make the patient vomit more violently than he will during the reaction. He surely would not do that, unless he wanted to get rid of an overloaded stomach, which probably he knows nothing about. Alcohol or whiskey will increase the amount of vomiting after reaction has commenced. That alcohol is a stimulant in cases of shock, or in any other case, is not true today, and never was true. (Applause.) Presuming it is true, the stomach will not absorb it, consequently it is not used that way. Put it under the skin, what is the result? You will have an abscess in all probability. I deny the benefit of alcohol in shock in any way that you may apply it, except you use it for the purpose of friction, and it does not do much good in that way. Friction without alcohol would probably be as successful.

Before taking my seat, I wish to refer to one phase of the subject so ably touched upon by Sir William Hingston a few minutes ago, namely, that hæmorrhage was not the cause of shock. Let me give you an illustration that is quite familiar to you. All of you have attended a case of confinement at some time or other, and after the confinement is over the patient is absolutely quiet, there is nothing to cause shock, and suddenly you are asked to come into the room, that there is something wrong with the patient. You are probably out looking after the baby, and talking to the old lady. You walk back into the room and you find the woman thoroughly blanched with every possible symptom of shock. She has lost a quart of blood, perhaps. What are you going to call it?

A voice: Hæmorrhage.

Sir William Hingston of Montreal: I did not wish to convey the meaning or impression in my previous remarks that shock and hæmorrhage are the same. Hæmorrhage is something entirely different. It is true, shock and hæmorrhage may coexist. The distinguished gentleman who has just taken his seat gave us an illustration where shock occurred as a result of hæmorrhage in a puerperal case, but

I would not consider that as having any particular bearing upon the subject under discussion.

Dr. Milton Jay of Chicago: The question of shock is a very extensive one, and it seems to me it would be much better if our remarks were confined to shock alone, and not attempt to cover the entire field. There is a difference between collapse from hæmorrhage and shock. If you will make three divisions, call one hysteria, depending entirely upon the mental condition; another collapse, and one genuine shock, which has its origin in the ganglia of the nervous system, then you will have three different conditions. I cannot conceive how any individual, without having had an injury, simply from hæmorrhage can have a shock. A patient can have collapse, he can have syncope, the heart will cease beating, and he will die. That is not a shock. But shock is largely due to the infliction of a severe injury, and the nervous system is slightly or profoundly affected. The mental disturbance may be such that it is strictly hysteria. I think the first paper read this morning came nearer defining the pathology of shock than anything we have at the present day, and yet, as the author of the paper admits, we do not know much about it. But when an injury has been received, the mental effect may be sufficient to produce disturbance in the ganglionic structure of the spinal cord so as to separate the cells that compose the ganglia there which are connected by contiguity, and it is shock that disturbs and separates the cells. If a patient receives an injury and is shocked and we have hæmorrhage, you must arrest the hæmorrhage, or the patient will have syncope, followed perhaps by collapse. If you make these three distinctions you will have more light on the subject.

Dr. W. F. Trigg of Cumberland, Md.: There is one question that occurs to me, namely, is there any remedy on earth that will prevent shock, or that will do any good if administered? I do not think there is. On the other hand, in my limited experience I have used strychnia, morphine, alcohol and atropia, and I have come to the conclusion that in profound shock we may as well leave the medicine in the bottle as to try to introduce it into the system. I do not believe any of these remedies are absorbed until probably after the patient has survived the shock.

Dr. Outten: You mean a case of profound shock, where the patient is almost in extremis?

Dr. Trigg: Yes.

Dr. Outten: I do not think anything would do such a case any good.

Dr. Trigg: I think a case of shock will get well just as soon without the administration of a remedy as with it.

Dr. Outten: The doctor's idea of profound shock means that the man is already dead, and consequently there is no necessity for treating him.

Dr. A. L. Fulton of Kansas City, Mo.: I have many remedies that I use in cases of shock, such as strychnia, spartein, nitro-glycerine, and morphine hypodermically. I use all of these with great care. In profound shock a patient will stand an enormous dose of strychnia administered hypodermically. We have a lot of good remedies, and we can combine them if we think it wise to do so.

Dr. Trigg: I would like to ask Dr. Fulton whether he thinks these remedies will be absorbed in cases of profound shock. Do we get the effect of them?

Dr. Fulton: I think so.

Dr. W. H. Elliott of Savannah, Ga.: The discussion seems to have drifted to the treatment of shock. I wish to add my testimony to what I heard the other day. I am perfectly satisfied that in severe shock there is something that can be done. It has been stated here that there are two elements in shock; one a physical pain, and the other a mental disturbance. I believe one of the surest means of curing a wounded person is to get him out of pain. I believe that to be equally true of shock, and for that reason I am in the habit of injecting hypodermically small doses of morphia. I believe it is the best remedy for relieving pain that we know of for a longer period than it would be advisable to give chloroform. Therefore, I combine it with atropia because it is one of our best heart stimulants. I find with these two agents used hypodermically I can relieve pain, and perhaps what is equally important, the mind is tranquilized. I find if a patient is too severely shocked to undergo an operation, I can get him into a condition more quickly and safely

with atropia and morphine than anything else I have tried. I do not believe in alcohol under these circumstances, except in limited quantities, for I believe the stomach is in such a state that it is not capable in severe shock of absorbing anything.

Dr. R. B. Moore of Texas: I have been a little surprised in this discussion that some one has not suggested the propriety of adding to the intravenous saline injection, morphine, strychnia, or other stimulants that are so often used under the skin, and not absorbed until the patient has recovered from shock. In cases of profound shock there is no question but what intravenous saline injections do good, and if we add strychnia to them we will accomplish much more. I have seen it done with excellent results, although I have not done it myself. It is just as well to put it in the vein and let it be absorbed.

Dr. G. P. Conn of Concord, N. H.: There is one point which I would like to make in regard to this subject, and that is with reference to shock which is progressive in its character. We have all seen men who have that admirable control over self, that so long as they are in danger they will stand up and do what is to be done, and when danger is past, down they go. When your President and myself wore the Gray and Blue we saw men brought in who were shot through the arm and leg, and knew nothing about it until afterwards. You may call it syncope or shock, there was no hæmorrhage, and they would break down. The shock was progressive in its character, and it is one of the worst forms of shock which we have to contend with. A man stands up and directs what he will do, or he is under a railway car or an engine, and he directs how to use the jack-screw to lift the engine so as to get it away from him. Men so injured do not experience much pain, the shock is progressive, and it may be two or three hours before he reaches the worst of it, and medication does very little good. As has been stated here to-day, until there is absorption there is no effect from medication. We can produce a greater effect in a mental way than we can by medication.

My friend from Montreal (Sir William Hingston) is correct when he divides and separates shock from hæmorrhage. Hæmorrhage usually means syncope and death. Shock means death by its effect upon the nerve centers, by disorganization, and the nerves can never pull themselves together to get the effect of absorption of medicines. There are different degrees of shock, and every case must be a law unto itself, and must be dealt with according to what we find.

Dr. John L. Eddy of Olean, N. Y.: I have been very much amused at the turn this discussion has taken, as well as at several ideas that have been advanced. One doctor, in speaking of the horrors of alcohol upon the human system seems to labor under the impression that there is only one avenue open in the human system by which acoholic stimulants can be introduced. Some two years ago a man was stealing a ride on the cars west of Buffalo, and in trying to get off when the train was going into the yards he fell under the cars, and both limbs were crushed. He lay for several hours by the side of the track before he was found, and he was almost lifeless, indeed, the pulse could not be counted. He was put to bed, warmed up, and about six ounces of whiskey were injected into the rectum, and before we got through with the operation twenty ounces of whiskey all-told were used. The man lived, and his stomach was not overloaded with the whiskey, as the Doctor says, and he did not vomit it. It was there and got in its work, and were it not that the system absorbed the whiskey, I have not the slightest doubt the man would have been a corpse. I believe in the use of a certain amount of stimulants at certain times, and I believe that whiskey injected into the rectum under such circumstances does good.

There is another method of resuscitating people who are in collapse from profound shock, and that is to introduce the two thumbs into the rectum and stretch the sphincter muscle. A man may be so profoundly shocked that you can cut off a limb and he would hardly flinch, and yet he will come to after stretching the sphincter muscle in that way. I have seen it done and have done it time and again in my own practice in rectal surgery.

With reference to the divisions of shock which have been given, I was glad my friend from Montreal (Prof. Hingston) and another speaker separated them into subdivisions and classes, because there is certainly a difference between profound shock and syn-

cope or collapse from hæmorrhage. I recall the case of a young man who sustained an injury on a railroad, where the flesh was stripped from the bone above the knee so that it turned over like a stocking. His countenance was clear and pulse good, he was uncovered, and some one stripped him down, and the moment he saw his own limb there was profound shock. He was as white as a sheet, rapidly sank, and was dead in a few hours. I think he would have been living to-day if he had not seen his own limb. One of the speakers said the time would undoubtedly come when pathologists and microscopists would point out the dividing line between the two. When the time comes that the microscopist can photograph lightning in the heavens, and locate it in its place, then perhaps we will be able to locate the dividing line between mental and physical shock, where one ends and the other begins.

In dealing with shock we must make up our minds that every case of shock that comes before us in a problem of itself. You have got to elucidate the problem and treat the case by itself, as you cannot take a dozen cases of shock and treat them all alike. You have to divide them. In some cases you can commence by giving chloroform, some of them have intense physical pain, and when that is present, by giving morphine and atropine, or chloroform, you save the patient's vital energy that will be of use to him later on. If you can get these remedies into the circulation, they will produce an effect. It has been stated that in a case of profound shock, if medicine is thrown into the system it would not necessarily follow that it would have any effect. I will answer that question by referring to the case cited by Dr. Hingston. This young man was practically dead for several hours, and I do not believe any hypodermic injections of morphine, or of anything, would have done any good, and nothing else but the vigorous application of the Doctor's whip would have done him any good. I tell you, it takes a great deal of heroism to go into a man's house, where he has a son lying down practically dead, drive the mother out of the house, and apply the whip vigorously to a corpse. (Laughter.) It takes a great deal of pluck, but the result showed that the Doctor was right. But if he had not succeeded, I am afraid he would not have gotten away alive.

Dr. D. Girdwood of Montreal, Canada: I have listened with intense interest to the discussion which we have had upon shock, and it seems to me that there are several questions arising out of it. One occurs to my mind: Does shock always occur from the same cause? May we not have a variety of causes producing the same result? What I understand by shock is some sudden effect, or some effect which is continued long enough to produce such a state of fatigue of the nervous system that it does not respond; in other words, that for the time being the nervous system loses its capability of receiving impressions. We have similar things occur in other cases, and here I would say that the physiologist and the pathologist have not yet been able to determine that there is any lesion in any part of the nervous system in cases of shock. That, perhaps, is because they do not yet know, and perhaps never will know, what the individual moleccular movements of the brain cells, brain material, or nervous material in the spinal marrow is, or what their movements may be in the healthy state of each individual. In me they may be one; in the President another. We have each perculiarities of nervous system during health. What impresses me may not impress the president, and what impresses him does not impress me. If we all have precisely the same accident we should suffer precisely the same results. That, however, is not known to be the case. As railway surgeons, we have the matter to consider that each individual has his own peculiarities, as mentioned by my friend, Dr. Eddy. Each case has its own peculiar idiosyncrasies. It would be well if we could ascertain the idiosyncrasies of each individual prior to the time of sustaining injuries. We are not called early enough, sometimes, after an accident to see shock itself, and sometimes at a still later period we are called upon to prognosticate what is going to take place. Unless we know what the condition of the nervous system was prior to the injury, or accident, how is it possible for us to determine what will take place? This we do know, where the nervous system has been subject to an influence, if we give it time, Nature will bring about recuperation of the system. If we wait, and the shock is not sufficient to kill,

recovery takes place, and in all cases we may predict that there will be recovery if due time is given for rest. If we place the patient in a condition to receive the greatest possible repose, remove all mental excitement, the probabilities are that the case will recover.

Whatever shock may be, it produces a perturbed condition of the cells of the nervous system, and the best way to do is to supply the system with healthy blood. If, then, we should have hæmorrhage in consequence of an accident, in addition we are deprived of that natural support which would in due course recuperate the nerve cells. For the time being the nervous system is not capable of receiving further impressions.

Dr. F. J. Lutz of St. Louis, Mo.: I did not intend to participate in the discussion of these papers, but I feel called upon, in view of the discussion which has taken place, first of all to protect the poor unfortunate pathologist and physiologist. I know we live in a utilitarian age, and we all want to do what we can for our patients, but often regardless of the reasons which actuate us in doing so. While pathologists have not definitely discovered the exact changes which occur in the nervous centers, yet neurology has taught us that the ganglion cells undergo certain definite changes, the result of their functional activity. It is not far fetched to say that the nerve centers also undergo, if not similar changes, at least a change of some kind, and above all things, a study of the physiology and pathology of the central nervous system in connection with shock has enabled us scientifically to draw a distinction between shock and hæmorrhage, a distinction which we have made following the theory which is always an obstacle to human progress—the theory of authority. We have been led by physiologists and pathologists to know that in hæmorrhage the difficulty is essentially and primarily a mechanical one. The great loss of blood is simply due to the fact that the heart has nothing to contract upon, and it exhausts itself in a useless effort to perform its physiological function. On the other hand, in shock the condition of the central nervous system is of such a character that the ordinary physiological stimuli, which normally are all-sufficient for the exchange of nerve power, are no longer capable of acting upon the central nervous system. Unfortunately we know of no drug or chemical which can be administered to a man in shock which will have the desired effect like we give quinine to a man with malaria, or like we give a dose of salts in order to clean out the intestines. But we do know by analogy that rest, unless the disturbance of the nerve centers has been so profound as to place them beyond recuperation, will result in the re-establishment of function.

As to the use of strychnia, I question experimentally and by observation whether it acts upon the central nervous system. I think it is a valuable tonic for the heart, because it is a stimulant to muscular fiber. I believe, on the other hand, when we have associated with shock hæmorrhage, and in railway surgery that occurs quite frequently, naturally we are liable to associate the two conditions. When we have hæmorrhage and shock, I question whether or not intravenous injections of normal salt solution are not all-sufficient to tide over the dangerous period a patient who is profoundly shocked. I give strychnia, and I would not feel true to myself did I not give it. But shock and hæmorrhage, as has been repeatedly stated in this discussion, should be kept separate, and to my mind the most satisfactory division of the treatment of these two conditions, whether separate or conjointly existing, is, on the one hand, the mechanical one; and the introduction of a large quantity of fluid (for your patient in a condition of shock is suffering from intravascular hæmorrhage) will do good. The patient perhaps has bled into his own vessels, and naturally the amount of blood necessary for the heart to carry on its mechanical function is so diminished as to leave nothing for it to contract upon.

A word or two more and I have done. The distinction between collapse and syncope and shock is by no means recent. Billroth well understood the condition, and in his lectures dwelt upon it, and his students have elaborated it, so that practically, whilst the distinction is so apparent, it appears it is not generally recognized, or perhaps not generally believed in. Shock, collapse and syncope are conditions dependent upon very different factors. The injection of drugs under the skin and into the blood may be purely mechanical. The

mere fact that you inject quinine into a vein does not necessarily prove that its action upon the plasmodium is going to take place; and the fact that you inject strychnine into a vein does not prove that its action is going to follow, and so forth. There are other factors which must be considered in determining the action of chemicals or drugs upon the economy than their mere presence. How do we know but that in shock the secretions have been checked, just like the heart's action has been enfeebled? Motion and sensibility have been diminished, and how do we know but that the action of drugs, or rather, the ability on part of either the blood, the lymph, or nervous system has been so altered as to make the injection of strychnia as harmless as the injection of distilled water?

Dr. H. L. Getz of Marshalltown, Iowa: When I came into the room Dr. Outten was discussing this question, and our president remarked to me, "He is giving it to you, good." I did not hear all of what the Doctor had to say, but I do not believe it was anything very severe, because I can hardly see how Dr. Outten could fail to comprehend what was so clearly defined a few moments ago as to the varieties and causes of shock, and the differences between shock proper and hæmorrhage, and the effects. But Dr. Outten remarked concerning physical shock and mental shock, evidently making a distinction between the two, but that is not specific. All types of shock are necessarily physical in result and effect. When you say physical shock, it amounts to saying horse. You do not say whether it is white, large, small, or what it is. Therefore, it is objectionable to use the word physical shock. It is functional shock, from fear, grief, or from injury to parts of the body remote from the brain, and organic shock when the brain cells are directly injured.

A word in regard to the remark made by Dr. Taylor, who stated that an individual had suffered from shock, and apparently it was not severe. In an hour later what he regards as shock was marked, and he admitted that the patient was practically bleeding to death internally.

Dr. Taylor: I intended to say that the patient was not suffering from shock when I first saw him.

Dr. Getz: It seems to me the patient was not suffering from shock at any time, but from the effects of active hæmorrhage, in that the man was bleeding to death, and possibly to the grief and pain and fear of the result there was added the effect of mental or functional shock through the intelligence center. Whatever there was of shock in this case, it had nothing to do with the effect and the result of the hæmorrhage that was going on internally. In the obstetrical case cited by Dr. Fulton, it could not have been any other than that of the patient bleeding to death. What else could it be? The woman was slowly and quietly dying from hæmorrhage.

In the case of progressive shock referred to by Dr. Conn, the man had his arms both shot away. There was a certain amount of functional shock, the result of trauma remote from the brain, reflected. The man did not suffer, perhaps, the full extent of the shock that he suffered from later. What he suffered from later was fear, and grief of concern for the future, again a reflection through the center of intelligence, producing its effect. I admit that there is that type of progressive shock, but the hæmorrhage that may have occurred in this case after first seeing it was a separate thing, and whatever factor entered into the result, whether the man recovered, or died, it had played its own part, and was not a factor in increasing the shock. It was a realization of what had happened, a concern over himself, perhaps, or for others dependent upon him, that added to it.

I wish to refer to the case cited by Sir. William Hingston, in which he resorted to flagellation, and also to what Dr. Eddy said with reference to stretching the sphincter of the rectum. Dr. Hingston gave us an important thought in connection with homœopathy. I will go one step further and say there has been advanced here the idea that an injury producing shock places the nerve centers in such a condition that they are not able to recognize, as it were, anything of a lesser irritation. Now, these statements go to bear out the very modern theory that the flagellation no doubt was an irritation much greater than the boy received in falling into the canal; and the stretching of the sphincter muscle forcibly was also a matter of more moment than the individual had received in a traumatic way so far as the injuries were concerned.

Dr. James H. Letcher of Henderson, Ky.:

I wish to emphasize the importance of the distinction between hæmorrhage and shock. The case reported by Dr. Taylor was undoubtedly one of hæmorrhage, as was also the obsterical case mentioned by Dr. Fulton. With reference to the use of alcohol, if any of you will use a clean syringe, and pure Kentucky whiskey, there will be no danger, and I have not the least doubt that the whiskey will do good. I have used it several times in a shock with benefit, yet I am a temperate man. In dealing with shock there are three things to be considered. The first is absolute physiological rest of both mind and body; second, the free use of strychnia; and third, the use of saline injections by the rectum or under the skin. I have a little apparatus, a glass receptacle, which costs only seventy-five cents, with a rubber tube and a needle. The needle can be picked out of the aspirating case, and we can inject the fluid under the pectoral muscles, or in the gluteal region, and I have seen no trouble from it. If we resort to those three measures, we are on the safe side.

Dr. J. D. Budd of Two Harbors, Minn.: I rise simply to call attention to one point: I have not heard the subject of heat mentioned in this discussion. It seems to me that in profound shock, where medicines administered by the stomach are not absorbed, on account of feeble circulation, some benefit is derived from the application of heat to the extremities. This point has been overlooked or neglected in the consideration of this subject.

Dr. T. McCullock of Chatsworth, Ontario: I wish to ask a question in regard to the injection of saline solution in cases of shock. In speaking of it one gentleman considers it safe to inject it in a case of shock; another gentleman stated that he believes some of these cases have a hæmorrhage into their own tissues. It naturally struck me that we could only hamper the matter by injecting saline solution in cases of this kind, and I believe it would do harm.

With reference to the question of heat, discussed this morning when I was not able to be present to listen to it, I will say that I had a case of puerperal eclampsia a short time ago, not a case of shock, in which I injected pilocarpine, and other medicines, without any benefit whatever, until I tried vapor baths. The patient began to sweat profusely, then there was no difficulty in getting good action from both morphine and any other drug that we gave. I do not wish to take up the time of the association by asking simple questions, but I would like to ask any gentleman whether he believes it is right in all cases to inject saline solution, no matter whether there be hæmorrhage or not. Personally, I believe it would do damage if we did it.

Dr. W. B. Outten of St. Louis, Mo.: A word or two more on this interesting subject. I believe the gentlemen of experience here will agree with me when I say that is it immaterial whether it be hæmorrhage or shock with which we have to do; there is no man who can tell which is which, when it comes on suddenly. There are certain conditions in which we have hæmorrhage; at the same time, when any of you attempt to discriminate as to whether you have a case of hæmorrhage, or one of shock, to deal with, you make a mistake. I do not believe any of you can tell the difference.

In answer to the question of the last speaker, the injection of normal salt solution is absolutely harmless. It has never killed a single soul, when injected in the flank, under the skin. It imposes no hardship; it is a matter of plain common-sense.

Dr. S. R. Miller of Knoxville, Tenn: I believe I have a more definite and satisfactory idea as to the pathology of shock than those who have participated in the discussion seem to have.

The theory of vaso-motor paresis as taught by our text-books I believe is wrong. The theory of vaso-motor constriction as a result of hyper-irritation I believe is correct, and I think we can explain the conditions existing upon this hypothesis. This I believe also explains the different results obtained by the speakers from the use of the same remedy in the treatment, such variations may, and do, occur in every one's experience.

Let us take strychnine as an illustration. It exalts all of the functions of the spinal cord, but has its selective action upon the multipolar ganglia in the anterior cornu. Here the vaso-dilator fibres have their origin. In shock according to the theory of hyper-irritation, there may be but little irritation to the dilator fibres and in such cases strychnine acts very beneficially. On the contrary, the dilator fibres may have received a greater proportion of irritation than the constrictor fibres, and strychnine is not indicated in such a case.

In my opinion quietude and heat is the best treatment, and in many cases all the treatment that is needed. How many patients have we found with imperceptible pulse and after a little quietude and application of heat the pulse returned as if by magic? I have used transfusion in all of its forms. Whether it be intravenous, subcutaneous or by rectum, the solution should be as hot as can be tolerated —say 115° to 120° F. In employing this solution in hæmorrhage the temperature is not of so great importance.

I believe there is a difference in the symptoms of shock and hæmorrhage and that this difference may sometimes be recognized by the careful, observing surgeon, though many cases cannot be differentiated.

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THE SYMPOSIUM ON SHOCK.

In other columns of this issue will be found the papers and discussion in full of the Symposium on Shock, which was such a successful feature of the Toronto meeting. The essayists and the members of the society participating in the discussion represent all sections of the country and all grades of professional service, from the local surgeon to chief surgeons and college professors. In the column of Translations is presented the ripe thought of one of the foremost French surgeons—Prof. Paul Reclus—from the monumental work edited by Prof. Simon Duplay and himself.

As Dr. Crile of Cleveland was prevented by his duties as regimental surgeon from engaging in the symposium, it is well to be able to read the accounts of his experiments on shock, taken from his address before the Chicago Gynæcological Society. After reading the essays and discussions it is refreshing to realize that, while there are diversities of opinion, as might be expected, from the number of participants, there is also a great unanimity of opinion on many points. It is believed and hoped that the publication of these papers will aid in establishing the pathology of shock on a firmer basis and enable the members of the association to treat the condition more intelligently.

THE POSSIBLE CONNECTION BETWEEN THE NEURON AND SHOCK.

As a result of the discoveries of Ramon y Cajal, Waldeyer, Lenhossek and others, we know that the old idea of the division of the nervous system into gray or vesicular and white or fibrous can no longer be entertained. In its place we learn that this system is made up of a vast number of units, which have been named neurons by Waldeyer.

Each neuron represents a single body cell and is structurally and consequently physiologically independent of the other neurons. As they are body cells just as much as epithelial cells or muscle cells, they possess protoplasmic cell contents and a nucleus the same as other varieties of cells. In addition, they are divided into several parts, (1) the nerve cell, which sends out from it (2) the protoplasmic processes or, as they are now called, dendrites, and (3) the axis cylinder or axon. The axon finally splits up into many fine fibers (4), which are in relation with those from another fiber and are called end brushes, end arborizations or end arbs for short. As before stated, the neurons are independent units and neither the cells nor the processes join except by contiguity. As Cajal expresses it, "The currents are transmitted from one cell to another by contiguity or contact, as in the joining of two telegraph wires."

This contact takes place between the end brushes of one neuron and those of its neighbor. In the higher animals it seems probable that more than one neuron is required for the conducting parts, so they are superimposed on each other. The terminal ends of the adjacent fibers inosculate with each other, forming somewhat of a network, but without actually joining.

Some years ago, in 1890, Rabl-Rückhard suggested that the neurons were not fixed but were capable of amœboid movements. This theory, which was announced independently

by Duval of Paris and Dercum of Philadelphia, opens up fascinating probabilities. Thus sleep is explained by Dercum as follows: "Sleep, instead of resulting from brain anæmia or some other apocryphal condition of the circulation, merely means that when the substance of the cortical cell has been diminished by activity, there comes a time when the processes are retracted so that the neurons no longer stand in active relation to each other. Interchange of action cannot then take place; unconsciousness follows; sleep is established. Spontaneous wakening merely means that after nutrition has reached a certain point, a point where the wasted cell has been replenished, extension of cell processes again takes place and interchange of active functional relation is reëstablished."

The same theory would hold good for memory and many other states and conditions. There is no need of pursuing the subject any further at present, but the practical application of the hypothesis lies in the possibility that in shock the same conditions may obtain. Through the psychic or physical violence, the end brushes of the neurons withdraw from each other, the nerve conducting parts are temporarily interrupted, and we have the clinical phenomena of shock resulting. After appropriate treatment, or from rest, the separated end brushes come into contact again, the vital phenomena are reëstablished and we say the patient has recovered from his shock.

Translations.

I. Traumatic Syncope.

By M. Paul Reclus.

(Translated for the Railway Surgeon.)

By traumatic syncope we understand a morbid state consecutive to external violence and characterized by suspension of the heart beats, arrest of the respiration and an absolute loss of consciousness.

HISTORICAL.

This accident seems to have been more frequent before the discovery and common use of anæsthesia. Nowadays if syncope follows the course of a grave operative intervention, it is always charged up to ether or chloroform, which are held responsible for all the catastrophes. This complication is but little known, in spite of all the researches on the subject.

ETIOLOGY.

Traumatic syncope has a double origin; sometimes it succeeds an abundant effusion of blood, sometimes nervous disorders—syncope by hæmorrhage and syncope by reflex action. The former results from large operative or accidental wounds, when the blood vessels have been largely opened and permit an enormous loss of their nourishing contents. The quantity then plays a preponderant role in this complication, but the rapidity is not without importance, and, equal quantities of blood being lost, a wound of a large vessel produces syncope more easily than one of a small vessel. The site of the hæmorrhage is to be considered also, and it has been found that when this is near the brain syncope is more prompt.

In any case the syncope is due to cerebral anæmia, the exsanguinated nerve centers suddenly cease their functions and the heart stops. Certain surgical interventions may stop the heart without causing the slightest loss of blood, by simply displacing the mass of blood in the brain, in punctures for ascites, for example, the dilated abdominal vessels engulf an enormous quantity of blood, to the detriment of the nerve centers and hypoæmias follow. It has been noted after thoracentesis also, but in this case the displacement of the heart and diaphragm by the effusion may cause symptoms of syncope whose mechanism is not exactly similar to those just mentioned. The same is true of wounds of the heart and when its movements are impeded by pericardial effusion.

In external violence the shock may not have caused any loss of blood, no vessel has been wounded and yet syncope is produced by "nervous hæmorrhage," as Dupuytren calls it, who believed that excessive pain might cause death. We have substituted the reflex theory for the vague conceptions of his epoch and we now know that syncope is caused by peripheral excitation of the centripetal nerves of animal or vegetal life, produced by the trauma. The excitation reaches the medulla and is reflected by the pneumogastric nerves which stop the heart. These facts are not unknown, but they have been corroborated by the researches of Francois Franck, who has demonstrated them with rigid precision and we now know the reflex circuit.

The excitation, as we have said, affects the centripetal nerves emanating from the cerebro-spinal axis or from the sympathetic system. In the first case the excitation may be aggravated by a violent pain, but the syncope and its dangers are far from coinciding with the importance of the wound. Authentic observations have been cited where insignificant wounds caused the sudden and definite stoppage of the heart. Verneuil has related a really extraordinary case where death by syncope

occurred as he was tracing the line of an incision for tracheotomy with the back of his bistoury. If the patient had been under anæsthesia this accident would certainly have been laid at its door.

Traumatisms in the region innervated by the great sympathetic also cause syncope, as we know by Goltz's experiments, repeated many times by Vulpian, who stopped the heart in frogs by tapping on the walls of the abdomen. The same result was reached by De Bernstein by electric excitation of the vagus and by Brown-Sequard, who lacerated the semilunar ganglia. But syncope is averted when we make a preliminary section of the pneumogastric, or when, like Franck, we paralyze it with curare or atropine, the reflex arc is broken and while the excitation reaches the medulla, the conducting path to the heart is wanting.

Clinical experience has for a long time shown us the existence of syncope following traumatisms of the abdomen and Holstang in his thesis of 1877 recalls the cases of Dupuytren. Abdominal surgery has proven the influence of certain operations on the cardiac symptoms frequently seen, as Terrier tells us, after hysterectomy; "particular symptoms and nearly always mortal." But in all operative traumatisms we must take anæsthesia by chloroform largely into account, for it singularly modifies the excitation. In the beginning, when anæsthesia is still incomplete, the chloroform itself may be the syncopic agent by its action on the respiratory passages. On the contrary, later on, after complete anæsthesia, chloroform prevents syncope by its temporary paralyzing action on the pneumogastric.

SYMPTOMS.

The symptoms and the definition of syncope are about the same thing. The heart's action is suddenly arrested, the blood ceases to be propelled toward the periphery, the face becomes white and waxy, sometimes slightly bluish, the eyes are hollow, ringed with black, and fixed, the pupils are dilated, the nose and lips pinched, the temples covered with cold sweat and the extremities cold. The pulse is no longer perceptible, and palpation and auscultation show that the heart no longer beats. Is it completely arrested even in cases of apparent death? Some authors claim that it still beats, but so feebly and slowly as not to be perceptible.

This arrest of the heart is not always so brusque; it may be preceded by vertigo, flashes of light and ringing in the ears, a cloud passes before the eyes, then precordial pain follows, sometimes nausea or even vomiting, and if the patient is standing he totters and falls down. If a vessel is opened hæmorrhage ceases, and this natural hæmostasis sometimes averts death threatened by the abundant hæmorrhage. The movements of the thorax and diaphragm are stopped and the patient loses consciousness. This condition of apparent death may last a very long time and may be the precursor of real death. But, more often, either naturally or from appropriate treatment, the heart beats reappear, feeble and slow at first, then more regular, at the same time that the rare and sighing inspirations regain their normal rhythm, and consciousness returns little by little.

Nothing is more difficult than to ascertain the cause of the syncope. Is the stoppage of the heart due to an excessive hæmorrhage, to reflex irritation or is it some moral emotion—the sight of blood or the terror inspired by the operation? Is it the result of some sudden lesion revealed by the autopsy, an embolus, or cerebral hæmorrhage as found in some cases, or is the chloroform alone at fault? A minute analysis of all the symptoms observed and of all the circumstances accompanying the accident is necessary, and still very often, even after the autopsy, no cause can be found.

TREATMENT.

When syncope comes from hæmorrhage and its consecutive cerebral anæmia it should be combated by returning the blood toward the brain. The head should be immediately lowered, the face slapped with cold compresses, then artificial respiration should be commenced and kept up, for cases of recovery have been seen after syncope of over two hours' duration. Subcutaneous injections of ether and the electric current may render some service. In short, the treatment of traumatic syncope is that of syncope in general.

II. Traumatic Shock.

By M. Paul Reclus.

We call traumatic shock that particular state which follows external violence and which is characterized by lowered temperature, more or less marked depression and exhaustion of the vital functions. It is often confounded with syncope, from which it should be differentiated, but it must be observed that the distinction is not always easy. For many authors "shock" is a badly defined morbid complex, without any proper existence and of which visceral contusion, cerebral commotion, blood or fat embolism, certain sub-acute septicemias and the internal hæmorrhages form the base.

HISTORICAL.

For a long time before the terms "prostration, collapse, lethargy, commotion, stunning,

stupor or traumatic shock" came into use, authors knew of a state of depression into which patients were plunged by external violence. However, while numerous cases showed a trace of these symptoms, it is not until the work of Travers* that we find an exact description. Since then there has been a great accumulation of works.

ETIOLOGY.

Even now very little is definitely known of the causes of shock. The gravity of the traumatism is an important factor and the stupor of the wounded is more frequent after falls from heights, great lacerations, and railway accidents, so well studied by Erichsen. Superficial, though large burns, lightning stroke, frost bite and gunshot wounds produce the same prostration. The location of the organ is also important and shock often accompanies violence to the more vascular and well innervated tissues, as the testicle, the large viscera, the intestines. Blows on the epigastrium are of especial gravity; we know the extreme richness in sympathetic plexuses of the organs contained in the abdomen.

The constitutional state of the patient is of interest also, individuals enfeebled by large hæmorrhages, those suffering from some chronic disease, the alcoholics, neurotics and anæmic patients are more exposed to traumatic shock than others. This condition may also follow severe operative intervention, the stupor and vital depression may be the consequence of an operative wound and it has been seen to follow ovariotomies, abdominal hysterectomy, or laparatomies, during which the intestines have been much manipulated. Hence shock occupies an important place in post-operative mortality, but which seems exaggerated by the English and American statistics.

By what mechanism is it produced? The current researches have not entirely dissipated the darkness surrounding this question. We speak of arrested innervation; the central and peripheral nervous system is, so to speak, stupefied by the external violence; such at least is the opinion of Gross and Furneaux Jordan. This sort of commotion of the nervous system is evidenced—so most authors tell us—by paralysis of the nerves. The great sympathetic being attacked, reacts on the vessels, provoking their paralytic dilatation, but the heart and other organs seem to be also partly arrested and their function is abolished in part. Verneuil believed in a sudden alteration of the blood prepared for it by some antecedent dyscrasia or some defect of an important viscus. According to Billroth, the factors are more numerous and hæmorrhage, pain, violent moral emotions and chloroform may be involved, and be each for itself responsible for the coma.

SYMPTOMS.

Three forms have been described, the torpid, the insidious and the erethistic. It is only to follow usage that we name the last. We know neither the pathogeny nor the pathological anatomy of shock, and the coma of the wounded should be based on the clinical symptoms alone, in order to range it with this or that complication of the wounds. Besides the "erethistic" form is characterized by agitation, cries, delirium, disordered movements and the coloration of the face, all symptoms exactly opposed to those shown by persons suffering from shock. It is impossible to understand by what invisible ties Travers tried to unite two syndromes so dissimilar.

The torpid form is by far the more frequent. The patient is completely relaxed; on lifting up the limbs they fall at once, the face is pale, drawn; the lips blue, the pupils dilated and sluggish, the eyes fixed, sunken, are sometimes shining, but the sensibility is dulled, speech is slow and questions must be short and imperative to obtain a response, which however, is correct, showing that some intelligence is present. Memory, on the contrary, seems to be wanting. The voice is broken; respiration feeble, irregular, sometimes sighing; the pulse is weak, frequent, dicrotic; the heart beats are scarcely perceptible; the extremities are cold and the general temperature is lowered to 36 or sometimes in 35 degrees C. [96.8 to 95 degrees F.]. The patient complains of no pain and death may ensue in this condition of stupor. In other cases reaction ensues, the warmth of the body returns, respiration is regular, the pulse regains its normal volume and all danger disappears.

The insidious form is less known, it is observed especially after railway accidents. At first the wounded person seems to present no appreciable general symptom, respiration, circulation and innervation are apparently normal. But very soon we perceive that the skin is icteric, pale, cadaveric; it has lost its elasticity, the limbs quickly become cold, the urine is scanty, the pulse feeble, the heart beats irregular, little by little or very rapidly the symptoms become aggravated, and the torpid variety follows until coma and death succeed the stupor, often in less than three or four days, occasionally after alternations of depression and excitement.

It must not be thought that the diagnosis is easy. While all authors have noted in their patients the stupor which we have described, they refuse to consider this depression a special morbid state and generally connect it with some accident, such as internal hæmorrhage, cerebral commotion, some circulatory trouble.

*On Constitutional Irritation. London, 1826

an embolus or even a fulminant septicæmia. We know full well that differential diagnoses are quoted and that our text books seek to give each of these affections a special symptomatology. But at the patient's bedside the distinction is not easy, and we believe that more researches are necessary to clearly delimit traumatic shock and make it an indisputable morbid entity.

TREATMENT.

This greatly resembles that of syncope. The first thing is to quicken the circulation, by frictions with alcoholic substances, wrapping up in warm flannels, massage, baths gradually brought up from 36 to 40 degrees [96.8-104 degrees F.], than subcutaneous injections of ether. Stimulating drinks, brandy, etc., the revulsives; sinapisms to the limbs may render great service. The question of operation will often present itself. Should we operate on an individual in a state of shock? As a general rule, no; and if there is no cause for immediate operation, such as hæmorrhage, we should wait until reaction has commenced before taking up the knife.—Traitè de Chirurgie de MM. Duplay et Reclus, Tome Iere, p. 170-175).

Extracts and Abstracts.

Experimental Research Into Surgical Shock in Abdominal and Genito-Urinary Operations.

By George W. Crile, A. M., M. D., Cleveland, Ohio.

There is presented in this paper a summary of the conclusions of one part of a general research into surgical shock. The whole research included experiments on more than two hundred dogs; the animals were reduced to surgical anæsthesia before the experiments were begun and allowed to die before recovering from the anæsthetic. The experiments were performed in the physiological laboratory of the Cleveland College of Physicians and Surgeons. After the animals had been anæsthetized, the various operations were performed, and the results noted by means of the graphic method whereby the alterations in the respiration and the blood pressure were recorded. These records have been preserved, and there is no statement made which cannot be amply verified by records in my possesssion. Chloroform or ether anæsthesia, while preventing the appreciation of pain, does not prevent other afferent impulses affecting the vaso-motor, the cardiac, and the respiratory centers. These latter impulses were found to be the essential causes of shock. The various phases of this question will be elsewhere discussed.

Abdominal Wall.—Incision through the abdominal wall. In making the incision through the skin in abdominal sections, there was frequently noted a fall in the blood pressure; this, in fact, was the rule. Upon making control experiments by producing slight pressure upon the abdominal wall a rise was observed, but the rise was only temporary. Cutting muscles and fascia produced little or no effect; on opening the peritonæum a fall was noted; in some cases there was no immediate effect. In exposing the abdominal contents in situ to contact with air, there was usually a gradual fall after some time had elapsed.

Peritonæum.—Contact, however slight, with the parietal or the visceral peritonæum, caused markedly arhythmic respiratory action; the amplitude was markedly, sometimes very greatly, diminished or increased and the curve broken and irregular. The diaphragmatic peritonæum produced the most marked respiratory changes. Continuation of the manipulation does not secure tolerance unless confined to the same area. We have many evidences of exhaustion of the respiratory apparatus by continued peritonæl excitation. The application of hot or cold water, especially the former, caused a very great increase in rapidity and depth of respiration. Exposure of the peritonæum or its manipulation caused rapid dilatation of the vessels of the mesentery and of the hollow viscera. The viscera became, at first red, and, after further exposure, gradually livid. The rapidity of the development of the lividity was somewhat in relation to the respiratory as well as the circulatory disturbance. The mesenteric veins became more prominent, especially the small venous radicals at the base of the intestines. On long exposure and great irritation by manipulation even the clear, transparent peritonæl spaces in the mesentery showed vessels and sometimes became red. The arteries at first seemed larger and pulsated more distinctly, but later, when the blood pressure had become quite low and the intestines livid, scarcely any pulsation was visible. With the development of these vascular changes the blood pressure pari passu declined. The more severe the injury, the greater the extent of contact and exposure, the more quickly and rapid was the decline of the blood pressure. In a few instances there was a preliminary rise, giving way to a decline later. Then again, in occasional instances, there was no notable change in blood pressure until as much as a half an hour had elapsed. Extensive and continued manipulation for as long as twenty minutes, and in one case half an hour, of experiment, scarcely altered the pressure. In weakly dogs or later in an experiment, the rate of decline in pressure seemed proportionate to the animal's

condition. A water manometer in the splenic vein, with its canula pointing toward the heart, showed a decided rise in a number of observations during the developments of splanchnic shock; while the central blood pressure was declining, the central portal was rising, showing an increase of blood in that area. In a series of experiments, the arterial supply of the splanchnic area, the cœliac axis, and the mesenteric arteries were clamped subperitonæally by making an incision along the anterior border of the rectus muscle and separating the peritonæum up to the diaphragm and over the abdominal aorta. With the splanchnic arteries thus clamped, no amount of manipulation would cause the characteristic decline as before.

Directly upon withdrawal of the intestines, in some instances, there was a sudden fall in the central, with immediate compensation following. This sudden fall may have been due to mechanical interference with the vena cava inferior or its tributaries. However, on slapping the intestines it was noted that they contracted, became paler and the central pressure would rise instead of fall. These observations were made a number of times. Attempting to find an explanation of this additional rise, the cardiac branches of the stellate ganglia were severed in addition to clamping the splanchnic arteries. On repeating like treatment of the intestines, there was sometimes observed a slight rise in the central blood pressure; but as well as could be estimated, not nearly so marked as before. The rise which now occurred could not be made to be repeated, while formerly it could be repeated on repeating the slapping and striking of the intestines. It would appear, then, there are also accelerating impulses which pass from the intestines through the cardiac branches of the stellate to the heart and probably to the vaso-motor centers as well. The slight rise which could not be made to repeat itself after the cardiac branches had been cut out was probably due to muscular contraction of the intestinal walls and contraction of the veins, causing an additional amount of blood to flow to the heart, and the veins not receiving a new supply, an additional amount of blood sufficient to cause this rise in central pressure could not again be forced out of the comparatively empty veins by such stimulation. Clamping the superior mesentery alone, as nearly as could be estimated, very greatly diminished the usual rapidity of the development of splanchnic shock. With all the splanchnic vessels clamped, if in addition the abdominal aorta was clamped, there was, as usual, a considerable immediate rise in the central pressure; however, this rise was maintained and the usual prompt compensatory fall without clamped splanchnics did not occur. Such observations were repeatedly made and would support the belief that the splanchnic area is the important compensating or regulating area of the circulatory apparatus. When the splanchnics were unclamped there was a staggering fall in the central blood pressure, and, although a compensatory rise was promptly inaugurated, it, in no instance, reached the mean pressure level. When compensation had developed as far as possible and a further intestinal manipulation was made, an immediate further fall was noted. While an animal was quite fresh, compensation, after a fall in pressure incident to the dilatation of the splanchnic vessels may occur; but it is usually not complete. In a weak animal or late in an experiment, compensation was rarely observed, even to the slightest degree. The decline was steady until death. The blood vessels of the large intestines are comparatively less affected than the small, the gastric vessels more than those of the large intestines, but probably less than those of the small intestines. The pelvic peritonæum, as nearly as comparative observations permit deductions, contributed less to the production of shock than the abdominal peritonæum proper. The omentum is precisely the antithesis of the foregoing; when any effect was obtained, it was a rise of blood pressure, a rising curve quite comparable to that following injury of the skin. The omental vessels manifested but slight dilatation after severe and continued irritation during which the vessels of the hollow viscera were extremely dilated.

Extra-peritonæal dissection did not effect either the respiration or the blood pressure notably, unless the splanchnic nerves had been involved, when there followed a decided dilatation of the splanchnic vessels and corresponding fall in blood pressure.

Liver.—Aside from the mechanical effects from forcing blood from this vascular organ by pressure and the effects of contact with its peritonæal covering, as above indicated, no special effects were observed. Dilatation of the cystic duct caused no appreciable effect. Manipulation of the gall bladder caused a marked temporary fall; but it is extremely probable this was due to mechanical interference with the blood current in the larger venous trunks lying in such close anatomical relation.

Kidneys.—Cutting, contusing, crushing, or any other mechanical injury of the kidney, caused no notable effect in a single instance, except when there chanced to be peritonæal contact. The same may be said of nephrectomy performed a number of times.

Supra-renal Bodies.—On similar treatment, a rise in the blood pressure was noted in a number of instances. No separate vaso-motor effects were noted.

[*Concluded in next issue.*]

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IS "RAILWAY SPINE" A FORM OF MENTAL UNSOUNDNESS?*

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At a recent meeting of the Surgeons of the Central of Georgia Railway I was requested to prepare a paper on the subject of "Railway Spine a Species of Insanity." Owing to my absence the paper was not read, and at the request of our worthy president I take the liberty of presenting it to this body. While recognizing freely its shortcomings, I hope to give you in a concise, practical manner some food for thought upon a subject somewhat threadbare but still always of interest to the student of railway injuries.

My experience of many years in handling a large number of railway injuries, and a few of injuries to spinal regions, and testimony later in these cases when in litigation, has directed my line of thought frequently to the pathological conditions of the celebral mass. Since the preparation of the first paper on this topic, two specially marked cases have been under my observation and have confirmed me in the accuracy of my belief as to the real seat of the pathological changes. Bear with me therefore for a short time only, and let us look into this subject, so pregnant with symptoms difficult to combat in defense and so interesting to the railway surgeon in differentiation as to diagnosis.

I wish it understood as a preface that the term "railway spine," as hereafter used, refers only to such injuries from railway accidents as have left no reasonable doubt as to the integrity of the vertebræ from fracture, or the cord from damage; in other words, those cases in which there is serious doubt as to whether the spinal column or its contents are at all injured. Starting then with this premise will simplify this discussion, and we will be in a better position to draw logical conclusions between minor injuries in the neighborhood of the spine and the more grave and lasting functional disturbances of the cerebrum as terminating in a mental unsoundness by which symptoms referable to the back are maintained and continued.

I propose to speak: Firstly, of some of the prominent symptoms of railway spine; and,

Secondly, of the conditions of mental unsoundness, the symptoms of which are similiar to those of the mind, and which give, to my mind, an evidence that in a large proportion of cases a "railway spine" is a "railway brain." A recent editorial has appeared in one of our leading magazines upon "Spinal Injuries in Railway Accidents," in which the editor asks the question: "But do many people really believe in a railway spine at the present day?"

From the days of Erichsen, the spinal concussion Erichsen, to those of Page (whose testimony has almost exploded every one of the former's "spine" symptoms), it was supposed and so argued that all symptoms in the region of the back and limbs following a railway accident were the result of damage to the cord; or in other words, a concussion of it. That conclusion, in the light of recent experience and discussion, is untenable. Railway spine is defined as "an injury which occasionally results from violent shaking received in a railway accident, having, as a rule, no external hurt to mark the damage done; with symptoms of extreme debility and weakness, in some cases approaching partial or complete paralysis." This may be a sufficiently explicit definition, but it would seem that even in the mildest cases, where symptoms were early referred to the spine, there

* Read by title at the eleventh annual meeting I. A. R. S., Toronto, July, 1898.

must be bruising, twisting or straining of the tissues external to the column.

In persons of neuropathic temperaments the slightest jar may produce symptoms of railway spine, a fact which has thrown much light upon the pathology of this affection, because it points to a condition of hyperæmia and hyperæsthesia of cerebral cells, producing what is known as traumatic hysteria, and not a disturbance of the cord itself. Included in the various symptoms are such as pains in the back and elsewhere, loss of sexual power, general malaise and weakness of the extremities, headache, sleeplessness, loss of memory, vertigo, inability to fix the attention and other symptoms which point to the brain rather than to the cord for location; making it evident that the spinal cord is not essential as a factor, as an explanation of such symptoms. Strain of the muscles of the back and of the ligaments of the vertebræ have probably been the chief cause of calling attention to the back; and yet most of such symptoms can be satisfactorily explained by disordered functions of cerebral centers, and are very closely allied to, if not the same, as those in hysteria, neuræsthenia and hypochondria.

It would be inaccurate to debit to spinal cells, centers and meninges, as is done in spinal irritation and concussion, such symptoms as peculiarly belong to the functional disorders of the brain, as sleeplessness, morbid apprehensions, irritability, heaviness in the lower limbs, formication, mental hypersensitiveness, flushes, chills and impotence, as well as defects of vision, such as astheropia or amblyopia; or of the ear, as nervous deafness. Because pressure upon a special process and around the spine produces painful sensations it is not uncommon to conclude that the seat of the hyperæsthesia lies in the cord, while, as a matter of fact, tender spots over the spine, and to its sides, simply refer to the terminals of sensory nerves from the cerebrum, and are not conclusive of spinal irritation any more than tender spots on the scalp are. The feeling of weakness in the back and loins may be due to fatigue of the muscles themselves—the contraction necessary to keep the trunk upright upon the pelvis, or the limbs in position. The feeling of fatigue is appreciated the sooner because the cortex receiving the impression is hyperæmic. Again, morbid fears, vaso-motor irregularities and extreme sensitiveness to temperatures are all found in functional cerebral disturbances.

One of the symptoms most frequently complained of is loss of sexual power or desire, but this symptom does not necessarily point to an injury of the spinal centers, for the centers of erection and ejaculation are under the control of the brain, and may be inhibited by a thought or by fear. Post-mortem examinations reveal nothing, so we adopt the theory of functional disturbances of the central nervous system, without, however, claiming them to be due to malnutrition, irregularity in vaso-motor control, or to reflexes from diseased organs. Atrophy of an optic nerve has followed a simple cerebral concussion. On the other hand, the functional disorders of cerebral cells which furnish symptoms analogous to those of the railway spine, so called, are hysteria, neuræsthenia and hypochondria, degenerating in some cases into hypochondriacal melancholia, or into dementia.

Let us look briefly into the symptoms of these disorders. Hysteria belongs to a diseased state of the nervous system, inherited or acquired, and has an infinite variety of symptoms, the most marked of which are easily referable to cerebral disturbances, the principal cortex sufferers being those of sensation and motion. Diseased irritability of these centers gives pseudo-paralysis—exalted irritability gives spasmotic seizures. In the etiology of the affection we find, operating as causes, mental and physical shock, violent emotions, severe trauma and psychical shocks, such as found during and after collisions or severe wrecks.

In a person easily or already predisposed to it, the slightest injury or shock may produce an attack, the severity of which bears no relation to the violence of the cause. Disturbances of sensation, motion, circulation and secretion, all referable to disturbed cerebral cells, are noticed. Hyperæsthesias and anæsthesias of various areas of the body are common; disturbances of special sensations with hallucinations are among the innumerable abnormal symptoms; also anæsthesias of single extremities, or of spots on trunk, back or limbs, bladder, rectum or vagina, with numbness of different portions of the body.

A hemi-anæsthesia may rapidly change

sides or be induced by blisters, metal contact to skin surfaces, or even the patient's expectant imagination may produce it. Among other disturbances of motion we may find spasmodic contractions in every part of the muscular system, or general convulsive seizures may come on as a result of physical or mental shock or from strong emotions. A hemi or paraplegia may attack any and all of the extremities. Among the symptoms of neuræsthenia we find many like those of hysteria and, in addition, anxiety, dread, morbid fears, fears of walking alone, of crowds, neuralgias, backache, and especially worthy of note excessive tenderness on pressure over the spine. The pain of neuræsthenic backache may be along the spinal column or further outward—at the attachment of sacral or iliac muscles; sometimes the most prominent symptoms are sensitiveness of the back to slight pressure, or pain without pressure. Pain in muscles and joints are not uncommon. Intense muscular pains in the legs starting up after remaining quiet for half an hour or so have become of such severity as to prevent the person from walking at all. Insomnia is one of the most important symptoms of neuræsthenia, and is usually present at one time or another during the disease. Hot flashes are frequently complained of by neuræsthenics, and may be due either to vaso-motor irregularities or simply to central disorders of sensation.

Impotence, premature ejaculation, sense of prostration after cohabitation are often met with among this class of sufferers and, by apprehensions, may lead to serious mental pathologies, even to insanities. Among the causes given as productive of neuræsthenia are concussion, accidents, fright or mental strain. As either hysteria or neuræsthenia may develop into hypochondria, and hypochondria into a condition of mental unsoundness bordering on dementia, or at least as taking the forms of delusions or milder hallucinations and illusions, and as this form is most frequent in persons with a railway brain, let us look a little closer into the symptoms peculiar to hypochondria.

We are all more or less conversant with the symptoms of a hypochondriac. He is an intense introspector, a first-class egotist; he makes mountains out of molehills, and in its fixed development his hallucinations and illusions become delusions which no amount of persuasion or argument can change. The slightest sensation made upon the body, or a suggestion or auto-suggestion may be sufficient to start a train of symptoms limited in variety and extent only by the amount of information he may have of his anatomy from hearsay or reading. Every kind of pain, every sensation, from a toothache to a paralysis, may be felt by this poor mortal. The concentration of his attention upon his special disease increases cerebral irritability and so increases the disease and magnifies it until his whole body seems disordered—he believes that he will never get well and is a total wreck. Sensations of twitching of the limbs, numbness, pins and needles, heart palpitations and of any portion of the body are among the prominent symptoms of this class.

Now, while my desire is to discuss this subject as much as possible from a pathological psychical standpoint, and to avoid a suggestion of malingering, it is also impossible to keep out the thought that a great number of cases of railway spine are willful malingerers. I use the word "willful" as distinct from the mental condition of the patient in which, while physical injury is extremely slight, he cannot avoid the cerebral condition which forces upon him his delusions, and while we may think that such are keeping up their symptoms and complaints with a view to litigation, yet to them—the non-willful malingerers, if I may use the term—the condition is very real. I wish to show that a railway spine is more often a railway brain; and, in the majority of non-malingerers, many degenerate into such a condition of mental unsoundness as to justify the assumption of irresponsibility.

Page has clearly and interestingly described the surroundings of a severe railway accident, be it a collision with all its horrors, or any other producing impressions of horror, fright, impending death, crushing of timbers, escape of steam, cries of the injured ones, darkness or what not, as producing upon a brain, especially upon one with a neuropathic heredity or tendency, such a series of tremendous impressions, exclusive of concussion, as to disturb seriously and for a long time its normal functions and to throw the person into a condition of hysteria or neuræsthenia, or to lead

to an hysterical mania, a hypochondria dementia or monomania.

In a brain which has received such strong impressions we have an abnormal condition in the resulting hyperæmia and hyperæsthesia, which may account for every one of the symptoms usually attributed to the railway spine. This brain answers readily to suggestions, either from actual sensations, as the spinal of strain upon parts external to the spinal column, or to blows upon the trunk or the extremities. It responds to auto-suggestions of possible results of such injuries, and, as the severity of the symptoms increases by repeatedly referred suggestions to the hypersensitive cortical cells, the disturbance in sensation and motion increases, until all kinds of sensory and motor phenomena develop, even to paralysis. The increased irritability of the cortex, holding sensory cells, increases their functional activity, and consequently the possible manifestations of all symptoms which such cells can possibly give to our consciousness. Pressure along the spine where there is no abnormal condition may be transmitted along a normal nerve tract and the impression upon the cerebral hyperæsthetic cells suggest an amount of abnormal condition about the point of pressure, or a distribution of motor impressions from the cortex as may make very real to the individual all the sensory and motor disturbances so prominent in hysteria and neuræsthenia. The seat of the disease is the cerebral cortex, not the peripheral terminals at the other ends of the wires. An examination of such a patient may be all that is necessary to suggest to him an unnatural condition of the part, or a direct question made to him in regard to a symptom may be all sufficient to make him really "feel" the condition suggested.

To anyone who has studied the possibilities of brain functions under hypnosis, as being able by suggestions to produce all sorts of sensory, motor or mental phenomena, it is unnecessary to argue to what extent a suggestion to the cortical center of any sense used to transmit the suggestion may evoke symptoms of abnormal perception in the patient. Authorities upon insanity state that it is difficult to determine where true hysteria ends and hysterical insanity begins.

Looking at it from the standpoint of a mental unsoundness, we might say that, when in either condition the opinions of the individual so control him in the transaction of business, in his family relations, or with the world at large, as to cause him to conduct himself at variance with the habits of persons in his station of life, he is insane. Hypochondriacal insanity is usually of a melancholic type; the varieties are manifold, depending, to some extent, upon what portion of the body is under inspection.

Let us take as one type of so-called railway spine a person of neuropathic temperament, and follow up his train of symptoms, to see if we cannot draw a conclusion which would confirm an opinion that he not only has no bodily physical injury approaching subjective symptoms, but may show that he has reached such a state of mental unsoundness as to constitute a species of insanity.

He is in a railway collision of severity. He hears the crashing of breaking material; he feels the sudden stop and is thrown violently about; he hears the agonizing cries of the injured, or the pleading and screams of the frightened, or sees them pinned down, dying or dead. Everything has reached his brain with lightning celerity; crowding every sensory avenue and packing the cerebral cortex with impressions. He may be in darkness with parts of the wreck afire, some loved one may be injured or killed, he himself is apparently unhurt. What strong man can go through such a mental strain and not feel that he is unable to go over the impressions made at such a time? Who could soon forget such horrors? The brain has had such tremendous accumulations of impressions rapidly made upon its sensory centers as to throw them into a state of abnormal activity. The batteries have become so charged and shaken as not soon to settle down to a normal current. A hyperæmia of all such shocked cell areas eventually ensues, and hyperæmia means hyperæsthesia.

Here, then, we have a condition which, in a brain of neurotic heredity or acquirement, does not easily change from a pathological to a physiological state; on the contrary, as soon as the hyperæsthetic cells begin to deliver to the consciousness of the individual, symptoms in peripheral areas of pain, formication, numbness or other errors of referred sensations, then

we have developed the apprehension of possible permanent lesions, morbid fears and the dreads of the neuræsthenic; or we have contracture, paralysis, etc., of the hysteric. The brain enters, as it were, into a state of hypnosis, ready for auto-suggestion originated by hyperæsthetic areas and terminating in (to him) real pathological conditions as to peripheries. Then as the fear of an approaching inability to make his living, to take care of his beloved ones, and possibly to become bedridden, the question of remuneration for his injuries arises, and he becomes a litigant. As the suggestions repeat and repeat themselves the irritability of centers increases, other sensations arise and he soon imagines himself, physically, a total wreck—possibly he is, mentally. Every sensation of the peripheral nerves is wrongly interpreted by his abnormal cortex, and he becomes impotent. His back is weak; his limbs are numb and he cannot walk. Pressure about the spine is interpreted by his condition of exaggeration into pain, numbness or paralysis; or even the suggestive questions of his medical examiner bring out new disorders. He is worse in that respect than the first course medical student who has every disease he reads about. As this cerebral tax goes on the man becomes a constant introspector. All of his thoughts are of himself, and when he has mentally so far progressed into a pathological psychic, that he cannot, by reasoning or argument, rid himself of the delusion; when his illusion becomes a delusion, and for whose dissipation there seems no cure or relief, then does this poor mortal become hypochrondiacally insane—mentally unsound.

Then it is that he can convince judge and jury, and sometimes his lawyer, that he has really a railway spine; and as each court term approaches, and the suggestion of the necessity that he should not lose his case, his worse symptoms present themselves to his deluded brain, called forth as suggestions from his memory storehouse, and he becomes worse and worse, and may present a face giving evidence of a physical wreck. Mentally he is not sound; morally he is not responsible; legally he may be entitled to recover. One step farther, and I have finished. Take an individual sustaining the same mental stock as the other; but unlike him, he has received bruises, or a twist and strain of ligaments and muscles along the spine. Here we have an actual pathological condition which conveys to the brain, already hyperæsthetic, the sensation of a bona fide injury; and which, by repeated suggestions from every motion and touch, keeps up the impression upon the cortex of a grave injury. If, however, at the time of the accident, this latter person has not had a severe mental shock, and especially if with a brain not neuropathic, then the slight injuries about the spinal column would, in all likelihood, go through the ordinary course of tissue repair, and we have no railway spine.

Much could be said along this line, but I have finished. I have accomplished my object if this attempt should have any effect toward changing the "railway spine" of Erichsen to the railway brain of Page; and while the damage done the individual by the change of title may be the greater, yet, in our study of the subject, or in our testimony in such cases, we are nearer the truth when we hold that the cerebrum, and not the cord, is the seat of railway spine; and that the cerebral cortex may be so diseased by the injury and its consequent suggestions and repetitions of suggestions that a species of insanity or mental unsoundness may result.

INJURIES OF THE HEAD.*

By C. B. Powell, M. D., of Albia, Iowa.

Injuries of the head of both hard and soft structures are of very frequent occurrence in railroad service as well as in general practice. The old injunction of "beware of wounds of scalp on account of danger from erysipelas," may now be well disposed of. With ordinary precautions as to cleanliness and aseptic dressings, I know of no class of injuries that heal so kindly. With a limited experience in railroad injuries of this class, as well as from those occurring in a mining district where the injury is frequent, from the slightest abrasion to a laceration that may almost sever the scalp, I believe I have never had arise a case of traumatic erysipelas.

The two classes of injuries are very similar, as the dirt in both is very apt to be ground into the flesh so that the tissues are filled and black-

*Read at meeting of Iowa State Association of R. R. Surgeons. Clinton, October, 1898.

ened with it to that extent that its complete removal is impossible. Yet with proper care, even if the tissues remain blackened, union will take place by primary healing. The only obstacle to this result will be in not securing asepsis. When there is contusion and laceration of scalp to any extent or where the force would suggest a possibility of fracture, the wound should not be closed until it is ascertained positively that fracture does not exist. As this injury may occur with fracture of inner table alone, or with fracture of both, with external table in proper apposition, with compression, it is safe always to make the exploration beyond the point of doubt.

In children there is a degree of toleration, not existing in adults, that later may prove to have been deceptive. The danger is not so great to remove a button of bone with the trephine as is the risk of permitting even a slight depression to go unobserved. Cases are numerous where fractures have occurred and where compression has resulted, and yet have been neglected until epilepsy or other neurotic disturbances have been the result. I do not wish to occupy the time of the society with a description of how to operate on these cases, because all are as familiar as I with the procedure and technique, but to emphasize the fact that this class of injuries should have the closest attention, and where there is any evidence of hæmorrhage within the cranium, or where there is depression, or evidence of compression, an operation shouud be performed for its removal, and to report some cases bearing on this subject.

On Sept. 26, 1897, J. D. was brought to my office unconscious, having been injured in some way on the railroad. As he was alone, and intoxicated, driving a single horse to buggy, it was not known just how the accident occurred. There was contusion and laceration of scalp, laceration from a point just over supraciliary notch to a point about center of parietal bone. Fracture of skull along this line, beginning about one inch above supra-orbital ridge and extending backward four inches.

At beginning of fracture line there was a stellate condition of fracture suggesting the probability of depression. The man was still under the influence of liquor, and while there was no impairment of movement of limbs it was deemed advisable to investigate the deeper structures. A small trephine was used at the outer border of fracture disclosing a clot immediately under the button and the wound. All being removed and hæmorrhage controlled the wound was closed. While there was no particular evidence of such condition it would have been lamentable to have had such develop—as it certainly would—after external wound had been closed. His other injuries were dislocation of right shoulder and elbow, compound fracture of humerus immediately above elbow, and fracture of two or three ribs. The man made a good recovery.

The second case is one, while not happening in the railroad service, is of such importance by having been neglected that I will risk its recital.

Jacob Lea, aged 32 years, farmer. At the age of 14 years, eighteen years previous to the operation, was thrown from a horse, his head striking against a stump. He was taken to the house and given such attention as was thought necessary. He kept his bed for several days and was drowsy and indisposed. I am unable to say whether a physician was called at this time. From the time of the injury to May 1, 1897, when I examined him, he had suffered continual pain in occipital and supra-orbital regions, very severe at times and never ceasing. There was photophobia but no change in pupils. His general health was good and he was a perfect athlete in appearance, weighing 180 pounds. About twelve years previous his mind became deranged, and generally grew worse, when in March, '96, he was taken to the insane hospital at Mt. Pleasant. After a sojourn there of some six months he was sent home as incurable.

At the date mentioned I examined him with a view to an operation. There was depression of skull from an old fracture along coronal suture, and forward along sagittal, depressing portions of both parietal bones, three inches in diameter. I advised an operation, which was done the following Monday morning, removing all of the depressed bone in a circle about three inches in diameter. There was immediate relief from pain that existed so long, and during his convalescence, or within a period of a few weeks, his mind became clear and rational. A year and

three months have elapsed, and he remains relieved of his insanity.

The object in reporting these cases is to insist on operative measures where there is a probability of intracranial injury.

As is sometimes the case motor disturbances do not occur immediately following, but other neurotic derangements will certainly result later on. In the first case it would soon have followed in a way that would have been embarrassing, if not fatal. In the second case it is remarkable that epilepsy did not accompany the insanity.

Shall It Be "Surgical Interference" or "Surgical Intervention?"

We have never understood why authorities in surgery use the word "interference" when speaking of operative or surgical treatment. When a surgeon performs an operation for the correction of a deformity, the mitigation of pain or the saving of life, does he mean to say that he interferes? If it be interference, then he is culpable; but certainly no operator will plead guilty to the charge of doing meddlesome surgery, and the inevitable conclusion is that the term "surgical interference" is a misnomer. Whenever we read it in textbooks or in current literature we feel like substituting the word intervention for "interference," using the word intervention in the sense of interposition, or, better still, mediation—a coming between for a friendly purpose. The word interference suggests the idea of collision, clashing, opposition, officiousness, intermeddling, etc.

According to Webster: "A man may often interpose with propriety in the concern of others; he can never intermeddle without being impertinent or officious; nor can he interfere without being liable to the same charge, unless he has rights which are interfered with."

Let us see what Trench has to say. We quote: "In our practical use, interference is something offensive. It is the pushing in of himself between two parties on the part of a third who was not asked, and is not thanked for his pains, and who, as the feeling of the word implies, had no business there; while interposition is employed to express the friendly peace-making mediation of one whom the act well became, and who, even if he was not specially invited thereunto, is still thanked for what he has done."

A few days ago we suggested this improved phraseology to two of our surgical friends, both of whom are teachers of surgery and liberal contributors to surgical literature. They agreed with us that the point was well taken and announced it as their intention to adopt the suggestion. Speaking for ourselves, this journal will hereafter use the term surgical intervention instead of surgical interference, and we shall hope to see its general adoption by surgical writers.—Richmond Journal of Practice.

The Atlanta Medical and Surgical Journal contains an account of an osteosarcoma developing very soon after traumatism, in the practice of Dr. Hunter P. Cooper. The man, aged 30, was admitted to the Elkin-Cooper Sanitorium, Dec. 10, 1897. On November 14 his left leg was crushed by a wheel of a railroad train, necessitating amputation above the knee. The operation was done in the town where the accident occurred. Infection followed the operation and septicæmia resulted. When he was brought to the sanitorium his temperature ranged from 102 to 104, pulse from 120 to 136 and he was very weak and emaciated. The stump was unhealed, the end of the bone protruding an inch beyond the flaps. The abscess extended from the very end of the stump to within three inches of Poupart's ligament. He was anæsthetized and the abscess opened fully by an eight-inch incision on December 13. A few days later the end of the bone was removed and the granulations curetted. His general condition improved rapidly for a while, but it was soon noticed that large knob-like masses were rapidly forming around the end of the bone. These grew with great rapidity. One of these was cut off and examined microscopically by a professor of pathology, who reported it to be a large-celled sarcoma. Amputation at the hip-joint was thereupon advised and consented to. It was done January 18, Wyeth's bloodless method being used. Two large drainage tubes were inserted and the patient recovered without any difficulty. The highest temperature recorded subsequent to the operation was 100 2-5, the temperature ranging most of the time between 98 3-5 to 99½. He was discharged on February 23, the wound being entirely healed, except where the drainage tubes were brought out. Dr. Cooper saw him very recently; he is in perfect health and has gained greatly in weight.

Scalp wounds should always be stitched, if of any size. But always remove the stitches very early, otherwise they may act as setons and lead to suppuration, which, if it reaches the loose layer under the aponeurosis, is likely to be serious. These wounds only gape if the scalp muscle or its aponeurosis is incised, and a very few stitches are needed.—Int. J. Surg.

Never allow a room to be swept or dusted just before an operation. Cover evrything with wet sheets, if necessary, so as to prevent the raising of dust.—Ex.

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NOTICE TO MEMBERS.

Members who propose reading papers at the Richmond meeting should bear in mind that the date will be two months earlier than last year. It is probable that the time will be early in May and it is none too early to commence their preparation.

"AN HONEST REVIEW."

It is a far cry from St. Louis to Cape Town, South Africa, yet the South African Medical Journal quotes approvingly from Dr. Lutz's review in a recent number of the Railway Surgeon, and styles it "An Honest Review."

THE MORTALITY OF THE LEARNED PROFESSIONS.

It has been noticed for years past that the mortality among physicians is very high, and Heese, in a recent paper,* accentuates this observation by a comparative study of the deaths among physicians, teachers and clergymen in Germany.

The average death rate among physicians in Germany is 11.5 per cent higher and the average death rate from diseases of the respiratory tract 15 per cent. higher than that of the population at large, while that from typhoid fever is 27 per cent higher. These figures show that this high death rate is due to the great exposure of physicians both to the weather and to the communicable diseases. The smaller death rate from respiratory diseases is due to the less active character of the contagion producing them.

As regards school teachers, their death rate, on the other hand, is below that of the populace at large. Carcinoma and pulmonary emphysema are some of the principal causes of death. The mortality is higher in the country, probably due to the smaller remuneration of the country teacher with correspondingly poorer nutrition in addition to harder work and longer hours.

Clergymen have been counted as "favorable risks" for a long time. Their freedom from financial cares is probably an important factor, as their stipend is assured, even though small. In Heese's tables their mortality is 14 per cent. below the average. For some reason or other the difference in the clerical death rate in the north and south of Germany is over 25 per cent. The deaths from disturbances of the digestive tract form a large proportion of the total in the south of the empire and the author attributes this to the large consumption of beer there. Tuberculosis and cancer are important causes of death in clergymen and the German statistics show that here as elsewhere deaths from cancer are increasing among all classes of society.

The above figures agree with those for other countries. Thus Ogle, in a paper read before the Medico-Chirurgical Society of London, says the death rate is 15.93 (per 1,000) in the clerical, 19.90 in the scholastic, 20.23 in the legal and 25.53 in the medical. Kortright (Brooklyn Med. Jour., June, 1895), in a paper giving the causes of death of physicians in that city for eight years, states that the average age at death was 54.6 years and that their mortality is four times that of other adult males.

In this connection it may be pointed out that

*In Philadelphia Medical Journal, Sept. 10, 1898.

the duration of life is longer in cold or temperate climates than in warm or semi-tropical. For example, the average number of inhabitants (per 1,000) over 60 years of age in Great Britain, Germany and Holland is 77, in Austria and Portugal 71, in Greece it is only 56. In the East Indies it falls to 40, and in South America averages about 50.

As a result of comparison of a large mass of data Jastrow concludes that "men of thought live 69.5 years or 3.5 years longer than ordinary men, while the lives of men of feeling (e. g., artists, musicians) are three years, those of men of action five years shorter than those of average men."

Translations.

TREPHINING IN TRAUMATIC EPILEPSY.

By Dr. Crickx of Brussels.

(Translated for The Railway Surgeon.)

It is not astonishing that surgeons fortified by the Jacksonian theory and sure of the benign nature of their operations have attempted to cure epilepsy by trephining. The first successes prematurely announced provoked an extraordinary enthusiasm which gave rise on all sides to operations on the cranium. But little by little a calm reappeared, the cases were better observed, and their physiological pathology more closely studied. The ultimate results were collected and showed the enormous importance of minute observation over a long period.

What does it signify if the attacks disappear for a few weeks, in a disease which presents so many bizarre symptoms. Has not medicinal treatment alone given given results where surgery has registered only failures? Have we not frequently seen the marvelous effect exercised by the most simple surgical operation? Unfortunately this effect, marvelous as it is, is none the less very transitory. It is by the light of these observations, which required long and patient research to show the importance of, that surgeons have examined the ultimate results of trephining in epilepsy. It must be confessed the results are not what was hoped for, the cases which appear the most appropriate for operation have resulted in complete failures while desperate cases have been cured by the simple resection of a fragment of cranium.

Thus the preliminary enthusiasm has given place to discouragement and the question of trephining in this disease, which was so interesting a few years ago, is now forced to the rear. The infrequent communications on this subject at the present time present the case in a very reserved manner. Nevertheless the cases are numerous enough and sufficiently well observed to merit a close observation. For this reason I desire to narrate the history of a case which will at least have the merit of having been under observation for a long enough time to render the results of the operation unmistakable.

C. G., a boy of 13, was referred to us by Dr. Neeckx of Lommel. There was nothing of note in his family or personal history. On Feb. 13, 1893, while playing near a windmill, he was struck by one of the sails in the fronto-parietal region, causing unconsciousness and hæmorrhage from the nose and mouth. The child was carried home and the attending physician found a depression in the right fronto-temporal region, the fragments were rendered mobile by the cerebral pulsations. He regained consciousness after some days and complained of great pain about the fracture. At the same time frequent convulsive attacks appeared in the face and all extremities, these disappeared rapidly, leaving, however, some diminution in intelligence.

Two years later (Feb., 1895) the attacks reappeared. They commenced by convulsive movements of the orbicularis palpebrarum, then the head was rotated toward the right, the fingers were clenched and afterward there were general clonic convulsions. These epileptic attacks were succeeded by great hebetude, they lasted for a whole year and recurred frequently, as many as twenty-six attacks were noted during twenty-four hours. From February to April, 1896, the attacks ceased, they then reappeared with the previous characteristics.

Bromide of potash was given in massive doses for two months and appeared to stop the attacks; however, they quickly appeared again and resisted all therapeutic measures. The intelligence kept diminishing and the

patient had to be fed as he showed no desire to take nourishment.

For the purpose of surgical intervention he was admitted to the hospital; he responded to questions slowly. A depression was found in the right frontal region almost as large as the palm of the hand, extending up from the right eyebrow, nearly to the median line, and losing itself in the temporal fossa, the edges of the depressed area could be plainly felt. There was no cicatrix of the skin; the pupils reacted but slowly and the right one appeared to be more dilated than the left. There was neither paralysis nor anæsthesia of the face or limbs.

The patient was observed for nearly two weeks and was seen in several of the attacks. We decided to operate, though without any great expectations.

[*Concluded in next issue.*]

Medico-Legal Notes.

Carriers.—Where a pass is given for a valid consideration, conditions exempting company from responsibility for negligence of servant do not bind the passenger. Williams v. Oregon Short Line R. Co., supra: A railroad company is not bound to rescue a passenger who has fallen from its train without its fault, unless it can be done with safety to other passengers. Reed v. Louisville & N. R. Co. (Ky.) 47 S. W. 591: A complaint for injuries received in attempting to step from a train held not to require plaintiff to show that the train had stopped at a station. Barry v. Boston & A. R. Co. (Mass.) 51 N. E. 518: A passenger injured by the negligence of a brakeman, conductor or engineer need not prove which one was negligent. Pomeroy v. Boston & M. R. R. (Mass.) 51 N. E. 523. A railroad company injuring a passenger, by letting off air brakes in their usual way, held liable, when the air could have been let off without such results. Pomeroy v. Boston & M. R. R., supra.

A passenger who obeys the instruction of a conductor of a railroad train cannot be charged with contributory negligence where injured in attempting to follow out the instructions. Chicago & A. R. Co. v. Winters (Ill.) 51 N. E. 901: Plaintiff's statement that she was hurt, made immediately after she was thrown from defendant's car, held admissible as a part of the res gestæ. Springfield Consol. Ry. Co. v. Hoeffner (Ill.) 51 N. E. 88s: The relation of carrier and passenger still exists when a passenger is obliged to alight from a car to go to another car, to be carried by the carrier to his destination. Chicago & A. R. Co. v. Winters (Ill.) 51 N. E. 901: Plaintiff cannot recover for injuries sustained while stealing a ride on defendant's train. Rickert v. Southern Ry. Co. (N. C.) 31 S. E. 497: Street railway company held liable to a passenger who, alighting at direction of motorman, on a dark night, catches her foot and falls. Sowash v. Consolidated Traction Co. (Pa.) 41 Alt. 743: Carrier held liable in damages for expelling intoxicated passenger from station on a stormy night, whereby he died from exposure. Haug v. Great Northern Ry. Co. (N. D.) 77 N. W. 97.

Damages.—In action for personal injuries, all those which are the natural and proximate consequence may be proved under general allegation of damages. Croco v. Oregon Short Line R. Co. (Utah) 54 Pac. 985: Plaintiff is not required to aver all the physical injuries which he sustains from the wrongful act of defendant. Croco v. Oregon Short Line R. Co., supra: Special damages are those which are not the probable and natural result of the injury, and must be specially pleaded. Croco v. Oregon Short Line R. Co., supra: The nature and extent of the injuries, mental and physical suffering, and loss of time, held proper to be considered by the jury in determining damages for personal injuries. West Chicago St. R. Co. v. Foster (Ill.) 51 N. E. 690.

In an action for personal injuries, where plaintiff died after suit commenced, and his executrix then prosecuted the action, an instruction as to measure of damages held not objectionable. Missouri, K. & T. Ry Co. of Texas v. Settle (Tex. Civ. App.) 47 S. W. 825.

Death.—A verdict for $10,000 for the death of a man 70 years of age is not excessive. Chesapeake & Ohio Ry. Co. v. Dixon's adm'x (Ky.) 47 S. W. 615: It is not error to instruct a juror to assess the damages for the death of plaintiff's intestate at such sum as will reasonably compensate plaintiff for the loss sustained, and that in fixing the amount they may take into consideration the power of deceased to earn money. Chesapeake & Ohio Ry. Co. v. Dixon's adm'x, supra.

In action for damages for death by wrongful act, poverty or dependence of son cannot be shown. Chicago, P. & St. L. R. Co. v. Woolridge (Ill.) 51 N. E. 701: In an action for damages for death of defendant, who was a shoemaker, evidence as to condition of the shoemaker business is not admissible. Chivago, B. & Q. R. Co. v. Gunderson (Ill.) 51 N. E. 708.

Master and Servant.—Granting that the derailment of a train is evidence from which negligence as to a brakeman may be presumed, it does not support the averment of negligence in permitting the track to remain in an unsafe condition. Louisville & N. R. Co. v. Victory (Ky.) 47 S. W. 440: It is not negligence,

as a matter of law, for a section hand, at command of track foreman, to attempt to board street car going three or four miles an hour. Chattanooga Electric Ry. Co. v. Lawson (Tenn. Sup.) 47 S. W. 489: Track foreman running trolley car carrying tools and controlling the car held a vice-principal in ordering track hands to board the car while in motion. Chattanooga Electric Ry. Co. v. Lawson, supra: Boss over the wiper of an enginehouse held not a vice-principal. Knox. v. Southern Ry. Co. (Tenn. Sup.) 47 S. W. 491.

A railroad company which had taken out accident insurance for the benefit of an employe, and deducted the premiums from his wages, held not liable to the employe when injured. Carpenter v. Chicago & E. I. R. Co. (Ind. App.) 51 N. E. 493. Where two methods are open to an employe in performance of his duties, that he selects the more hazardous one held not to show contributory negligence if it was one which a reasonable person would adopt under the circumstances. Florida Cent. & P. R. Co. v. Mooney (Fla.) 24 So. 148. A brakeman who is thrown from the pilot of an engine by the negligence of the fireman in charge, and is injured, may recover of the railroad company. Louisville & N. R. Co. v. Foard (Ky.) 47 S. W. 342: A railroad company is liable to a brakeman only for the gross negligence of his superiors. Louisville & N. R. Co. v. Foard, supra. A railroad company held not negligent in omitting to put on a passenger train a signal indicating that inspectors were under the cars, because the rule requiring it did not apply to passenger trains at stations while in transit. Warn v. N. Y. Cent. & H. R. R. Co. (N. Y.) 51 N. E. 744. Proof that the servants of a railroad company who were operating a train that killed an employe were in fault puts the burden on the company of showing that deceased was negligent. Augusta Southern R. Co. v. McDade (Ga.) 31 S. E. 420: What risks are usually incident to a given business must be determined by the jury under the facts and circumstances of each case. Augusta Southern R. Co. v. McDade, supra.

Railroads.—A company held liable for the death of a fireman killed in the fall of a locomotive through a burning trestle. Bateman v. Peninsular Ry. Co. (Wash.) 54 Pac. 996: A locomotive fireman and a section foreman are not fellow servants. Bateman v. Peninsular Ry. Co., supra: Traveler at railroad crossing must use his senses to discover approaching train, though there are needless obstructions to the view of the track. Chicago, R. I. & P. Ry. Co. v. Williams (Kan. Sup.) 54 Pac. 1047: It cannot be said as a matter of law that emission of sparks from locomotive is not evidence of negligence. Baltimore & O. S. W. Ry. Co. v. Tripp (Ill.) 51 N. E. 833. Direct evidence is not necessary to prove that one killed at railroad crossing exercised due care. Chicago B. & Q. R. Co. v. Gunderson (Ill.) 51 N. E. 708: One waiting at railroad crossing has right to rely upon presumption that any approaching train will obey city ordinances by ringing its bell and reducing its speed. Chicago, B. & Q. R. Co. v. Gunderson, supra: Where the injury did not occur at a public crossing, the burden is on plaintiff to show that the engine was not provided with a proper bell. Boyd v. Cross (Tex. Civ. App.) 47 S. W. 478: A railroad company held liable for running against a pedestrian while he was passing through an opening in a train beyond a street crossing. Golden v. Pennsylvania R. Co. (Pa.) 41 Atl. 302: It is error to permit plaintiff suing to recover damages for personal injuries to prove the neglect of a physician employed by defendant railroad company to treat his injuries. Louisville & N. R. Co. v. Ford (Ky.) 47 S. W. 342: Whether a boy six years old was guilty of contributory negligence in going in front of a moving train at or near a street crossing was properly submitted to the jury. Allen v. Ames & C. Ry. Co. (Iowa) 76 N. W. 848.

Street Railroads.—Averments that a street car was run carelessly and negligently, and at a high rate of speed, so as to make a great noise, do not state facts showing negligence. Terre Haute Electric Ry. Co. v. Yant (Ind. App.) 51 N. E. 732: There is no liability for failure to stop a street car on approaching a frightened horse, where it does not appear that thereby the horse could be got under control, or that the occurrence of an accident could be apprehended. Terre Haute Electric Ry. Co. v. Yant, supra.—Chicago Law Jour.

The state supreme court of Indiana has decided that when a railroad maintains a hospital for the care of its disabled employes, with funds deducted from the wages of the employes, it is legally liable for the malpractice of surgeons employed in such hospitals. The decision was rendered on an appeal from a judgment of $6,500 recovered by Frank M. Kelley, a former fireman on the Wabash road. The record of the case shows that Kelley worked for the railroad seven years, during which time he paid 50 cents a week toward the support of the hospital. In August, 1893, his foot was crushed by a locomotive and a portion of it was removed at the company's hospital at Peru. It is alleged in the original bill that there was employed at the hospital a physician who was addicted to the use of drugs and liquors, and that this surgeon, while under the influence of either or both, decided that it was necessary to amputate more of the foot, and did so a week after the first operation. The work is alleged to have been done in such a manner that a third amputation was necessary.—Med. Standard.

Extracts and Abstracts.

Experimental Research Into Surgical Shock in Abdominal and Genito-Urinary Operations.

By George W. Crile, A. M., M. D., Cleveland, Ohio.

[*Continued from page 442.*]

Spleen.—No special results were noted other than when that organ was compressed; there was an immediate small rise probably due to forcing out blood from its vascular meshes. Splenectomy was performed a number of times and with practically no effect.

Bladder.—Cutting, compressing, over-distending, or otherwise injuring the bladder. caused a rise in the blood pressure, if any effect at all was produced. In many of the observations no effect was noted. Pressure upon the full bladder produced the most marked results.

Uterus.—Incision, contusion, manipulation, or any other mechanical injury of the uterus, caused uniformly a rise in the blood pressure. The rise appeared rather tardy, but was in many instances very marked. Sometimes the pressure gradually declined to its former level, but tended to remain, for some time at least, at the level to which it rose. Repeating the injury at intervals before compensation occurred, raised the mean pressure very considerably, comparable to the rise caused by clamping the abdominal aorta. Cutting the cardiac branches of the stellate does not prevent the rise. While conclusive proofs are not at hand, there is considerable evidence that the rise is due to vaso-motor action. What has been said of the uterus may be said of the ovaries and oviducts and in importance in the order given. Ten bitches each furnished repeated observations on these points; Cæsarean section was twice made and noted for the absence of any changes in the pressures during operation.

Male Genital Organs.—Cutting the testicles, spermatic cord, tunica vaginalis and frequently even the skin of the scrotum, caused, in most instances, a fall in blood pressure appearing after a considerable interval. Manipulation, though gentle, of the testicle nearly always caused a very marked fall in central pressure; the same observations were made with regard to the spermatic cords. In short, any manipulation of any part of the testicle—its coverings or the spermatic cord—was attended by a marked, sometimes exceedingly great, fall in blood pressure. While the center pressure was falling, the portal was usually as markedly rising as evidence of splanchnic dilatation as the cause of the fall. The blood pressure usually recovered completely, or nearly, its former level. These observations were made 53 times and occasionally, though rarely, no fall was marked. Respirations were slowed and shortened and in some instances irregular. Injecting cocaine into the organ, into the tunica vaginalis, or into the spermatic cord after a control had been first obtained, then repeating like operative procedures, no fall occurred in central and no rise in portal; neither were the respirations altered. Following an injection of a sufficient quantity of atropia into the jugular vein after securing an inhibitory laryngeal control, thus proving the atropia competent to abolish cardio-inhibitory impulses, the testicle was subjected to experiments similar to the above and the usual fall in pressure followed. The fall was not prevented by preliminary section of the vagi. This is taken as evidence that the fall is probably not due to a cardio-inhibitory effect. Jugular injections of cocaine did not prevent the fall in the pressure, though, as nearly as could be judged, the fall was considerably less than in the controls.

Penis.—The same may be said of the penis, though the alterations were not observed to be produced in nearly so marked degree.

Vagina.—Forcibly dilating, or otherwise injuring the vagina caused an increase in depth and frequency of the respirations and usually a rise, though occasionally a decline, in blood pressure. In several instances there was no effect on blood pressure, but respiratory action was increased.

Anus.—Forcibly stretching the rectum and anus causes sometimes a rise, sometimes a fall, in blood pressure and an increase in the frequency and the depth of respiration. There is considerable evidence that the fall in pressure was due to mechanical interference with the flow of blood in the venous trunks, viz.: the fall appeared almost instantly, and the manometer in the femoral vein showed a rise at the same time that the central was falling.

II. FACTORS PRODUCING SHOCK.

1. Duration of Operation.—The duration of an operation was found to be an important factor in the production of shock. Animals may be killed by the effect of continuous anæsthesia alone, though carefully administered, so that a percentage calculated upon the ratio between the actual duration of anæsthesia and the average length of time a dog may survive continuous anæsthesia is allowed the pure anæsthetic factor in any given case; that is to say, if ten hours may be allowed as the average length of time a dog may live under continuous anæsthesia, and a given experiment lasted two hours, then 20 per cent. of the cause of death was calculated to have represented the anæsthetic factor. This cal-

culation applies to ether. There is strong evidence tending to show that chloroform, even barring accidents, is a more potent factor in destroying the animal than is ether. The element of time in relation to the exposed field may be stated as follows: contact with air is a very great irritant of local tissues, owing to the lowering of local temperature and to the drying. The effect of exposure is strikingly observed in case of the peritonæum, pleura and brain. Exposure effects particularly the vaso-motor mechanism. If a bloodless field of operation, the thigh, for example, be exposed, it soon becomes suffused with blood, all the vessels become dilated, the translucency of the tissue is lost and further dissection then becomes bloody. The brain, when exposed, soon becomes abnormally irritable, and, in faradizing the cortex over a given motor area, say the foreleg, there will likely be an over-action. Many adjacent centers may become excited and not infrequently a general convulsion is produced. However, after a time the hyper-excitability is followed by non-excitability. In the fresh state, or when kept covered with normal salt solution, within certain limits of time the motor discharges correspond with the area of cortical stimulation. The same may be said of nerve tissues generally and the importance of preventing exposure of the brain, the cord, the vagi, the splanchnic and other special nerve tissues must be ever in mind. Exposure of the thoracic cavity causes great disturbance of respiration and the time should be as short as possible. Exposure of the capacious splanchnic area is attended by a rapid dilation of the splanchnic vessels, leading to intense congestion, detracting thereby a dangerous amount of blood from the somatic circulation, inducing a rapidly declining blood pressure. Even the apparently bloodless spaces in the omentum on exposure become red. Not only does exposure of the peritonæum cause splanchnic vascular dilatation, but also the respirations are unfavorably affected as well. The element of time in abdominal operations, in every experiment, was unmistakable. In animals subjected to extensive removal of integument, shock was induced in rapidity in proportion to the area of exposure; and in depth to the duration of exposure. The exposure of the tissue, as a factor in the production of shock, was believed to bear a direct ratio to the area and the duration of the exposure.

2. Temperature.—Observations on this point must necessarily be relative, but it seemed to us that when the opened tissues were exposed to cold air in the laboratory during winter experiments while the heating apparatus had been temporarily out of order on account of freezing, the animals seemed to succumb more readily than under the ordinary warmth. The effect of the cold water on the intestines and intra-venous cold saline solution showed more directly the depressing effects of the cold. Then again, the direct effect of warm towels applied to the exposed intestines, of warm saline in the abdomen, improved the respiration directly and, as nearly as could be estimated, caused at least a check in the declining blood pressure. The striking contrast between the effect of cold and warm salines on the exposed nerve fibers, and especially on the exposed cortex cerebri, was repeatedly noted. In electric stimulation of the motor areas, it is entirely essential to keep the cortex warm in order to obtain the best motor stimulation; indeed, a cool cortex very soon becomes non-excitable. In a number of observations of the rectal temperature, a gradual decline, with but one exception, and that only at the beginning of the experiment it rose ⅛°, was always observed; in one instance, the temperature fell as low as 34.9° C. Iced saline caused a fall in pressure when the first flow reached the heart; however, the pressure soon rose; in warm solution, preliminary fall in no instance was noted. Local cooling, or even freezing of a part likely to contribute to shock, would, to the extent it blocked afferent impulses, prevent shock; but reaction is always to be considered, and, besides, our observations are more especially directed to the systemic effect rather than to the local.

3. Physical Condition.—Animals in impaired health, insufficiently nourished, too young or too old, are correspondingly bad subjects; even the laboratory servant's estimate of any given animal as to its value for a protracted experiment was usually well taken. Pregnancy did not seem to impair the resistance, but this statement rests on comparative observation. In bad subjects and after shock had been fairly induced, the reflexes were never so acute, vaso-motor actions were sluggish and ineffectual, and when the blood pressure declined, it was, as a rule, slowly or never regained. Animals having firm tissues seem to have greater resistance. Gross tissue resistance proved to be of a very fair index to vital resistance.

4. Anæsthetic.—So important a rôle is played by the anæsthesia that it was necessary to be constantly watchful, and when sufficient assistance could be obtained we supplied a special anæsthetizer. The respirations in over-anæsthesia became gradually more shallow and slower, and if continued, would fail suddenly. The blood pressure pari passu gradually fell. Upon removing the ether, both would rise, much as they fell. When the animal was about to come out respirations gradually deepened and quickened, and the blood pressure curve became irregular, pre-

cisely the reverse of the process in the entrance into the state of anæsthesia too profound. The respiratory indications were usually in advance of any other symptom in foretelling the tendency of the anæsthesia. The effect upon respiration was so constantly in advance of other effects, for example, the circulation, that the latter was habitually neglected; and in no instance, excepting in several cases while inducing chloroform anæsthesia, was there a sudden failure of the heart. If the animals were allowed to partially recover from the anæsthesia, care was necessary in reducing them to surgical anæsthesia, as the tendency to hypernœa attends this state, and an excess of the anæsthetic was likely to be inhaled. The exhausting over-respiratory efforts predispose the center to failure, and special care was always necessary at this point. The more the animal had been subjected to operative procedure, the more readily the respirations failed under the above conditions. In abdominal operations, contact with the peritonæum caused an increased, though irregular, respiratory rhythm, and this was occasionally mistaken for indications for more anæsthetic. Chloroform required much greater care than ether; either, in no instance, caused sudden cardiac arrest; chloroform, three times—each time early in the inhalation and before surgical anæsthesia had been induced. When, accordingly, more anæsthetic was administered, a profound depression was produced.

5. Hæmorrhage.—Loss of blood always predisposed to shock, and when there was considerable, even if it caused but little depression in the blood pressure, the animal did not withstand so severe or so protracted an operation. Hæmorrhage from the large venous trunks caused the most profound effect upon the blood pressure, because the heart was immediately supplied with a diminished amount of blood, while, if arterial, the income of blood was not so suddenly diminished. The output of the heart does not depend at all upon the height of arterial pressure, but is in direct proportion to the venous pressure. Inasmuch as the venous pressure is more directly lowered by venous hæmorrhage, the observed facts are in accord with the observations of Donaldson on the output of the heart. Dogs having enlarged thyroids have usually disproportionately large carotid arteries. Their blood seems to clot less readily, hæmorrhage is everywhere more free and there is less tendency to spontaneous arrest. Hæmorrhage is especially free in the neck. It has been said by able clinicians that shock was another name for hæmorrhage, but in a large series of bloodless operations animals have succumbed. In this series of observations, unless particularly mentioned, there has been no consequential hæmorrhage. Respirations are always accelerated and deepened in profuse hæmorrhage. A given amount of loss of blood when the animal has been already reduced to surgical shock caused more depression than an equal amount earlier when the compensating vaso-motor mechanism was more active.

6. Vaso-Motor.—There is sufficient evidence at hand to establish at least a high degree of probability that the shock in operations on the splanchnic area is largely caused by disturbance of the local splanchnic vaso-motor mechanism. The experiments of Mall showed that the splanchnic nerves are vein nerves and control this large and spacious vascular area. Every experiment in this area gave evidence of the dilatation of the vessels controlled by these nerves and the decline of the pressure occurred pari passu with this dilatation. A water manometer inserted toward the heart, in the splanchnic vein, showed a rise in pressure, while the central was falling; there being no valves in the veins of this area, the manometer probably correctly registered the portal pressure. The entire splanchnic area, excepting the distal part of the splenic vein, was left unimpaired. The spleen was either extirpated or its arterial supply clamped. So far as could be determined by direct observation, the veins were much more dilated than the arteries; in fact, toward the close of the experiment, when the veins were much engorged, the arteries were comparatively small. While the vaso-motor mechanism played an important part, that it is not the whole cause rests on the following evidence:

Clamping the thoracic aorta or the splanchnic arteries retroperitonæally to effectually remove this area of vessels as a factor, on extensive and continuous manipulation and operation the intestines became paler than normal and the veins comparatively empty. However, death was, under these conditions, caused from shock by mechanical injury of this area, though not so readily as in cases in which the splanchnic arteries had not been thus clamped. The blood pressure does not suffer decline as under normal conditions, but the respirations were affected no less than under normal conditions and after continued manipulation of the intestines the respirations became gradually more shallow and usually failed before did the heart. The latter grew gradually weaker and finally failed, thus dying independent of the vaso-motor splanchnic factor. It must be observed, however, that the animal with excluded splanchnic circulation endures much more splanchnic injury. The great shock caused by injuries of the male genital organs is probably due largely to vaso-motor dilatation of the splanchnic area. The gradual decline of blood pressure preceding death in most of the prolonged experi-

ments was interpreted as a vaso-motor breakdown and from this state an animal could rarely be even temporarily raised.

7. Cardiac.—The heart stands at the base of support to the blood pressure, and any interference with its action at once causes marked changes in the pressure. The output of the heart is in direct ration to the pressure of the vena cava and not at all to the height of the blood pressure. The venous pressure, then, determines the heart's output and the venous pressure is dependent upon the force and frequency of the heart beats, together with the necessary vascular tone which is under control of the vaso-moter nerves. If, then, the area of peripheral resistance is lessened, the venous pressure will be diminished and so the output of the heart will be diminished. Supposing the peripheral resistance remained unchanged, if the heart's action be diminished in force or frequency, or both, the venous pressure will fall pari passu with the central; and again, with the lowered venous pressure, the output of the heart would be diminished. The cardiac action and the peripheral resistance remaining the same if venous hæmorrhage occurred or if there was mechanical interference with venous flow, the venous pressure would be lowered and the output of heart diminished. Other things remaining the same, an increased output of the heart causes a rise in the pressure and vice versa. This was repeatedly shown by the effect of the infusion of normal salt solution. The efficiency of the heart action may be diminished by an over-stimulation or by a continued use of stimulus. Exhaustion follows such over-action. There may be over-stimulation of the augmentary mechanism, especially that of the brain. The heart action may also be interfered with by the excitation of the inhibitory impulses, as in operations involving the inhibitory area in the larynx, brain, etc., as elsewhere described, often causing a staggering fall in pressure. The heart action is also greatly dependent upon efficient respiratory action, as is shown in a number of instances in which respirations have failed, the heart, beating on in sweeping strokes, soon stopped. Also, upon producing artificial respiration, the heart, after a quiescence of as much as fifty seconds, in one case, began action again. The peripheral pressures usually paralleled the central, showing their variations were caused by changes in the heart action. The diminished temperature of the blood, previously referred to, might be a cause of impaired heart action. Upon this point we are not prepared to offer any new evidence.

8. Respiration:—In 103 of the experiments in which the exact manner of death was recorded, or, in which, in the course of experiments, either the heart of the respiration failed first; respiration failed first in 90, the heart first in 4, and both simultaneously in 9. In many instances the heart was beating strongly, and the blood pressure good at the time respiration failed. Artificial respiration was frequently required during the course of the experiments. The greater the extent of the dissection, and especially if dissection had been made in the thorax or the abdomen, respiration became more readily exhausted. In bloodless amputations of the hip joints and other mutilating experiments, death was sometimes caused by respiratory failure. Almost every injury causing any effect on the circulation causes respiratory changes, usually more striking than the vascular, and, in many experiments, notably in the splanchnic area, respirations were more sensitive to irritation than was the circulation. In traumatisms of the brain, the respirations were strikingly more affected than the circulatory, and the immediate cause of sudden death from traumatism of the brain was, in almost every instance, failure of respiration. In one gunshot wound, where the medulla was not touched but only affected by the percussion of the ball, death was caused by respiratory failure. In gunshot wounds of the chest, in cases in which large vessels of the heart were not penetrated, death was caused by respiratory failure. In laryngeal operations and injuries, respirations were very easily inhibited. In almost every instance of dangerous anæsthesia the respirations were most effected, and frequently stopped suddenly. The heart could be depended upon to continue beating until the establishment of artificial respiration. With the amount of evidence this research has furnished bearing on the sensitiveness of the respiratory mechanism, we are led to estimate it as one of the important factors in the production of shock.

POST-MORTEM APPEARANCES.

Autopsies were made in a large number of the animals, and, generally speaking, the following conditions prevailed; the large venous trunks were full, sometimes enormously engorged, the arteries empty, the veins of the splanchnic area not more distended than those of the somatic, unless the experiment had included some procedure in the splanchnic; the left ventricle and the left auricle empty; the right auricle usually contained some blood, the right ventricle but little or none; the lungs anæmic; pulmonary vessels empty; tissues of the brain and of the somatic area anæmic; liver usually engorged; spleen and kidneys somewhat less so. The disposition of the mass of blood was, in a number of cases, observed by making the necessary dissection during and before death.

On the Prevention of Shock.—The less the

insult to the tissues, the less was the shock; the less the hæmorrhage, the lighter the shock. Not only the amount but the method of the admiration of the anæsthetic was found to be important. The horizontal postures, or the head inclined were most favorable. Mechanical interference with the large venous trunks was found necessary to avoid. The abdominal cavity is shock-producing in something like a direct ratio of the distance from the pelvis; the region of the diaphragm, especially the pyloric region, is probably greatest and the floor of the pelvis least shock-producing.

Preliminary administration of alcohol did not seem to favorably effect the results. The same may be said of morphia. Atropia, on the whole, seemed to diminish the amount of shock; but on account of taking off thereby the vagal control from the heart the blood pressure curve was very irregular. Cocaine, hypodermically, to a very great extent prevents vaso-motor splanchnic changes; and the general blood pressure in the cocaine experiments was almost as well sustained under like procedures, as in the experiments in which the splanchnic arteries or the aorta had been closed previous to the splanchnic experiment.

ON THE TREATMENT OF SHOCK.

1. Aqueous extract of supra-renal capsules of sheep was tested. There was an immediate and marked rise in blood pressure, but the pressure was not at all sustained; the fall was as rapid as the rise.

2. Strychnia sulphate caused a marked but later rise in all the pressures and the rise was well sustained.

3. Artificial respiration is of undoubted importance, and we have in our collection many records of the remarkable effect of artificial respiration on the vaso-motor and the heart action and hence upon the blood pressure. The blood is insufficiently supplied with oxygen in shock. An increased supply of oxygen is urgently demanded.

4. Intra-venous infusion of normal saline solution causes in the first instance an increase in the venous pressure in the vena cava, and, consequently, the output of the heart is at once increased, the amplitude of the strokes lengthened, the chambers being full of blood, contractions, in consequence, become more forcible and the blood pressure rises after several beats after beginning of saline flow. The peripheral venous, the vena cava, portal, peripheral cephalic and central pressures all rise together. The rise of the vena cava and peripheral venous appears first and last and after the lapse of some time the portal would rise, but rose proportionately higher than the other pressures. If a small quantity is injected, the rise will likely not be sustained. In a 10-kilo dog as much as 750 c. c. was continuously injected, and the elevated pressure was finally sustained. Injections of quantities of 50 c. c. at intervals as needed serve the purpose well. Quantities up to twice the amount of blood calculated to be in the animal have been given before the pressure was sustained. After this considerable injection the wounds everywhere began oozing and the tissues became fairly wet. Hæmorrhages that had been insignificant recurred vigorously. Various temperatures ranging from 18° to 53° C. were employed and within a reasonable range, the effect seemed to be the same. The effect is apparently wholly mechanical. In a small dog 500 c. c. at 53° C. were injected, while the rectal temperature was being taken and found to have increased the temperature but one-fifth of a degree. Hæmorrhage, after injection of considerable saline, shows little tendency to spontaneous arrest or clotting. The combination of small and frequently repeated hypodermic injections of strychnia, together with saline injection, makes a most effectual combination. Strychnia alone causes acceleration of the heart, with shorter beats. Saline alone causes a more forcible but a long sweeping beat. The combination of both produces a more sustained effect, and more nearly normal beat.

Small doses more frequently repeated, producing an effect similar to the steady increment of a continuously flowing stream of saline, have appeared to produce the best results. —(American Gynæcolog. and Obstet. Jour.)

Kernig's Sign of Meningitis.

At a recent meeting of the Paris Hospital Medical Society M. Netter insisted upon the great value of a sign of meningitis described by Kernig in 1894. The sign is this: When a person in health sits up in bed with his leg flexed he can straighten it without difficulty; a person affected with meningitis cannot do it unless he lies down. Netter regards this sign as almost pathognomonic.—N. Y. Med. Jour.

If a divided nerve be immediately sutured, or if a gap caused by resection be immediately bridged with some suitable material, and the work be done aseptically and properly, but slight degenerative changes will take place either in the distal or proximal portion of the nerve, and the nerve's function will, in the great majority of cases, be quickly re-established.—A. H. Levings.

Irate passenger (who has managed to board a trolley car that didn't stop): Suppose I slipped and lost a leg—what then?

Conductor: You wouldn't have to do any more running then. We allers stops for a man with a crutch.—Boston Traveler.

Treatment of Wounds.

By J. E. Summers, Jr., M. D., Omaha, Neb.

SPECIFIC WOUND INFECTIONS.

Under the head of specific wound infections we classify those surgical wound diseases in which a wound is followed by certain more or less marked classical local and constitutional disturbances. For the production of these diseases there must be a wound or point of inoculation, which may be of slight moment, and be completely healed before constitutional symptoms develop; or unhealthy repair precedes and accompanies the appearance and of course of the general systemic poisoning. The infection or poisoning is microbic or bio-chemical. The diseases under consideration are separate and distinct from those mentioned when treating of interferences with wound repair caused by the presence of germs.

Erysipelas is a specific infectious disease due to the entrance into the lymphatics, small veins, and capillaries of the streptococcus erysipelatus, first discovered by Fehleisen, who, in his work on the Etiology of Erysipelas, published in 1883, tells how he proved conclusively that erysipelas is due to the infective properties of the streptococcus named after him. From little pieces of skin removed from patients suffering with erysipelas he made cultures on peptonized gelatine. From these cultures he obtained a streptococcus with which, after culturing many times (thirty generations), he inoculated eight persons, seven of whom developed erysipelas. This is as conclusive proof that this particular germ is the cause of the disease under consideration as that any other known germ is the cause of a classified disease. The bacillus develops in the skin, subcutaneous cellular tissue, and sometimes in the mucous membrane. The growth of the cocci produces an inflammation which tends to spread rapidly, and as a result of the growth products or toxins are formed which produced constitutional symptoms sometimes of a violent type. Clinical evidence has absolutely proven the contagiousness of erysipelas and the mode of entrance of the contagium is always through some breach of surface. Although in the laboratory the identity of the erysipelas streptococcus with that of the streptococcus of suppuration is apparently established, yet clinically erysipelas is followed by erysipelas unless the greatest care is exercised by the surgeon in passing from the dressing of a wound infected with erysipelas to that of a healthy wound. Whereas no such danger is encountered in the treating of several wounds, one after another, when one or more are the subject of suppuration caused by an infection of the streptococcus pyogenes. The greatest danger in this latter is that a healthy wound, free from suppuration, may become infected as the result of a shiftlessness of antiseptic details upon the part of the surgeon. The older writers, and even many of our modern ones, consume considerable space in describing how unhygienic conditions, the crowding together of many wounded, bad ventilation, poor sewerage, debilitated general health, all predispose to the development of erysipelas. This is only true in that such conditions lead to a laxity of enforcement of now well known and proven preventive measures essential to keep out the invasion of many preventable diseases; all of which has been well illustrated by the lack of forethought and executive ability displayed by those in authority, and having in keeping the lives of soldiers in many mobilizations and in the camps of those engaged in active field service. This has been as well illustrated at the close of the century in our late war with Spain, both in the camps at home and in the field in Cuba, as in the campaigns of Napoleon in the early part of the century, and in the Crimea in the middle part of the century. Although science has advanced and the cause and prevention of many diseases has become well understood during the nineteenth century, and particularly during the last twenty-five years, yet little improvement has been made in subverting human selfishness among politicians, military and civic, to the common cause of humanity.

Symptoms.—The disease is usually sudden in onset, there being an elevation of temperature to 101 degrees F. to 105 degrees F., with chills or even a rigor. There may be nausea and vomiting, as observed in other acute diseases. At the end of about twenty-four hours a bright red rash makes its appearance around about and spreading away from a wound which may be apparently healed, insignificant in character, or of considerable size and importance. Most commonly the wound is, as has been described, "unhealthy" and not doing well. The rash is characteristic, disappearing momentarily on pressure and having a sharp and easily defined border. It does not gradually fade away from a center of great intensity of color to a pale border. Pressure is painful and there is intense burning over the area of the rash. The infectiveness of the disease is well shown by the enlargement of the lymphatic gland nearest the inoculated wound and the tendency of the infection to spread along the lymphatic channels to the next neighboring glands. Occasionally the rash is very pale, especially in anæmic patients; more commonly the color is dark or cyanotic. The tenser the tissue the paler the rash and less the swelling. On the other hand, in loose tis-

sues the rash is distinct in color and the swelling is very marked, and it is most often in loose cellular tissue that occasional complication develops, i. e., suppuration. Vesicles and bullæ are common, forming as the result of intense œdema. These bullæ usually dry up, and, in fact, except in very much debilitated subjects, suppuration or a more general breaking down of tissues and the development of gangrene is rare. The rash varies in its duration from a few days to several weeks, usually one week to ten days. Relapse is common. There is a continuous elevation of temperature, which, however, is of little importance unless it reaches above 104 degrees F.

After a few days the type of fever changes from that of a sthenic form to one denoting debility. Delirium is common and most often observed in erysipelas of the scalp and face. As the rash subsides, desquamation follows. Complications are sometimes observed. In facial erysipelas the rash may spread and involve the mucous membrane of the air passages, necessitating operative measures to prevent death by suffocation. Secondary involvement of tissues other than the skin is brought about by an invasion of such tissues from an attack of the skin covering them. As, for example, interior of joints, the peritoneum, the pleura, the meninges of the brain. However, this is not always so, as the writer has seen examples of secondary involvement of the pleura, brain, and peritoneum in cases where the disease began in the extremities. Probably all such cases are examples of blood poisoning, the germs being carried and lodged through the circulation into distant tissues and organs, setting up a secondary inflammation.

Phlegmonous erysipelas is a serious and oftentimes dangerous form of disease resulting from the invasion of the subcutaneous cellular tissues, and intermuscular septa by the streptococcus erysipelatus. This inflammation results in more or less sloughing of the skin and subcellular tissues. The clinical picture of this disease varies little from that of the cellulo-cutaneous inflammations caused by a penning up of the products of suppuration in infected wounds, as described in former pages when writing of the necessity of drainage in deep-seated suppuration. The inflammation usually begins in a wound of an extremity. There is rapid swelling, with discoloration of the skin, which suffers secondarily, the inflammation starting beneath and spreading toward the surface. The color of the skin is that of a deep red, which gradually fades into the healthy skin instead of the abrupt border of cutaneous erysipelas. The swelling soon becomes tense, brawny and painful, and, as in the cutaneous varieties, bullæ often form, and, unless relief is given by the surgeon, local areas of gangrene develop at the points of greatest tension. The forerunners of such a condition are observed as areas of dark blue color of the skin with œdema and doughiness; sometimes an indistinct fluctuation is present. Through the openings afforded by the at first circumscribed areas of gangrene rather a profuse discharge of pus takes place. In cases where there has been great tension, with late relief, either by the surgeon or unaided nature, extensive sloughs of the skin form. These may expose the muscles, the enveloping membranes of joints, and, in cases where the original injury opened up intermuscular planes, extensive destruction of muscles, and even bone, results. It is especially in the latter condition as, for instance, where erysipelas complicates a deep-seated wound, that the rather slow formation of sloughs and escape of pent-up pus results in blood poisoning. In such a case the pus, instead of seeking the subcutaneous cellular tissue early, often seems to elect, first, traveling between muscles and close to bones.

The constitutional symptoms are marked by pain, fever, early depression, especially if there is profuse suppuration and sloughing. Unless there is early relief of pent-up products of the inflammation, blood poisoning, with or without secondary infections and suppurations in distant organs or tissues, is apt to follow.

Treatment.—Every case of erysipelas developing or brought into a hospital should be isolated and every known principle of antiseptic surgery carried out in the treatment of the case. In examining and dressing the wounds sterilized rubber gloves should be worn and the naked hand should under no circumstances come in contact with the wound, body or bedding of the patient. If this precaution is adhered to the danger of infecting others will be lessened. It will not do to rely upon wearing sterile rubber gloves at operations, and at other times (after handling a case of erysipelas), in the office, private residence or dispensary, when doing little things, use the naked hands. True it is that the hands can be sterilized so that they will be ordinarily safe, but it is also true that the germ of erysipelas is very poisonous and hard to wash away. The writer recalls very vividly a personal experience in which he carried erysipelas from a case of erysipelas of the scalp, following a minor operation in private practice, to four other individuals, one in hospital, three in their homes. Every precaution seemed to have been taken, and exactly where the leak occurred is not known to this day, but there was a leak, and although no fatality resulted, much needless suffering did.

Precautions against infecting others should

be taken by nurses as well as doctors. It is best always to have a special nurse for such cases. In spite of a prejudice against it, there is no more grateful or curative an agent in the treatment of cutaneous erysipelas than moist cold. Cloths wrung out of a cold, mildly antiseptic solution are best for application, and the wound of inoculation should be treated upon its merits after the rules laid down for the treatment of infected wounds—drainage with antisepsis.

Numerous cures for cutaneous erysipelas have been offered, and some are beneficial. Among them, the covering of the inflamed area by an ointment of ichthyol in lanoline, one drachm to one ounce. A solution of thiol in water, 20 to 40 per cent, is recommended.

This is painted over the infected skin as well as for some distance beyond. Thiol is less objectionable than ichthyol, because of the bad smell of the latter, and it is reported to be almost a specific. Abortive measures by scarifications and the use of strong antiseptics are valueless to abort; at least that is the personal experience of the writer. The lead and opium wash is a soothing application, and is useful and grateful to the patient when the wound is insignificant. Shallow or deep incisions ought to be made when there is tension sufficient to threaten the life of any area of skin. Tonics, and especially strychnine and the muriated tincture of iron, are of value.

Cellulo-cutaneous erysipelas demands surgical interference. An incision or incisions to the bottom of the wound of infection must be made, and early. Sloughing of the skin should be anticipated by incisions before the vitality of the tissues is more than threatened. Free drainage should be established and maintained by copious and frequent antiseptic irrigations, and the part should be enveloped in large, moist antiseptic dressings. Tonics, stimulants and forced feeding are essential to maintain strength and resisting powers. Cold applications are harmful in this form, as tending to increase the danger of sloughing.

Secondary complications may require incision at a distance—they should be made early. Usually careful dressings, skin grafting or transplantation of large flaps will suffice for the repair of spaces of raw surfaces uncovered by sloughing. Occasionally, but rarely, amputation is required. It should never be done during an acute stage of infection. Death rarely follows acute cutaneous erysipelas, the mortality being less than 5 per cent, except among old people and children, when it is larger. The phlegmonous variety should be rarely fatal when treated properly. There will be, however, occasional deaths in spite of our best directed efforts.—Western Med. Review.

Soluble Metallic Silver in the Treatment of Septic Infection of Wounds.

By Dr. Oscar Werler of Berlin.

Of the multitude of drugs recommended for use in surgery and its specialties, but very few stand the test of practical employment as well as the silver preparations proposed by Credé as dressings for wounds. I refer to the citrate and lactate, but more especially to collodial silver recently introduced. The remarkable properties of this modification of ordinary silver, which is soluble in water, are of the greatest scientific interest. Of pre-eminent interest is the very valuable and as yet unique quality of penetrating the entire organism and effecting a general disinfection of the body.

The importance of such general antisepsis is very evident; but, Credé is the first investigator who has succeeded in filling this serious hiatus in therapeutics. Systematic chemical studies and bacteriological experiments have enabled him to discover a specific agent which removes the pathogenic factor by its powerful bactericide energy, without damaging the vital functions. The results obtained by Credé were in every respect encouraging; as have also been those published by G. Wolfrom, Hale, Schirmer and Weidmann. They show indubitably that the solid silver has a decidedly beneficial influence, and often effects a rapid and even surprising cure, in fresh cases of septic infection; and even does so in chronic sepsis and furunculosis, when the treatment is begun in time; and before secondary changes in vital organs have occurred.

There can no longer be any doubt that the argentum colloidale, employed in suitable cases and used by the right method, has shown itself to be a specific for sepsis. Many cases suffering from blood poisoning have been saved and cured by the use of this remedy alone. Credé's report upon the usefulness of the argentum soluble and the excellent results obtained with it in blood infections, contained in the recently published reports from the surgical division of the Carola Hospital in Dresden, are, in my estimation, thoroughly decisive upon all points.

I have recently published fairly thorough accounts of the method of the internal silver treatment, with critical considerations of its value and advantages. These I published in the "Dermatologische Zeitschrift" at the suggestion of my respected teacher, Professor Lassar. In view of the importance of the subject, I think it proper to now record my own independently obtained information and more mature judgment. Though my material includes as yet only three cases of pronounced septic disease, they were very characteristic, representing as they did types of acute sepsis,

chronic septic infection and multiple chronic furunculosis.

Case I. Ella L., 9 years old, Aug. 23, 1898. One week ago suffered a small wound on the right forefinger, which healed spontaneously. Since two days there has been a red spreading spot on the finger, on which has appeared a vesicle, which has broken. Twenty-four hours later the hand became reddened, swollen and very painful. There was anorexia, sleeplessness and fever.

Inspection showed a bluish circumscribed swelling on the extensor surface, in the center of which was a crateriform ulceration with a blackish base. The entire back of the hand is œdematous, the skin red and shining. Palpation shows œdema extending onto the forearm, with elevation of local temperature and intense tenderness. Careful pressure on the margins of the lesion causes the appearance of a small quantity of thick, bluish-red secretion. Pulse 120; the patient feels very weak. Diagnosis: An acute diffuse phlegmon of the hand following infection of finger, with incipient general septicæmia.

Treatment.—On account of the rapid spread and the symptoms of general intoxication, I ordered: Unguenti Credé, gram 1 (15 grains); Div. in chart. cerat. No. III. Sig. inunction; directing the mother to use one package on the cleansed skin of the left, healthy side of the body for twenty to twenty-five minutes in the evening. Externally I applied a cold wet dressing of a 1 to 4,000 citrate of silver solution.

August 24. Marked change; the child feels stronger and does not complain of pain. Pulse 108. Besides the improvement in the subjective symptoms, the local lesions, the wound and the septic phlegmon, show the marked and powerful action of the general silver medication. A second inunction was ordered, with a continuance of the wet dressing. 25th. Steady improvement in the subjective condition. Pulse 80. Can move the hand. No tenderness locally. Treatment continued. 26th. The third inunction was well borne. The edges of the lesion are paler and show whitish lamellæ of necrotic epidermis; its base is red and granulating. A fourth inunction was ordered for precaution's sake, and the local treatment continued. 27th. General condition entirely normal. 31st. Œdema entirely gone. The base of the ulceration filled with granulations. September 2d. Complete and healthy cicatrization.

The above case is a typical one of the acute form of blood poisoning so frequently seen in surgery, and its history may form the basis for the elucidation of the special indications for the use of the general internal silver antisepsis.

Case II. Marie M., aged 38, Aug. 24, 1898. Has suffered for four years from an obstinate affection of the skin of both heels, characterized by pachydermia, fissuring and occasional weeping; some weeks ago it became so bad that she sought the aid of several physicians. In spit of this her malady got worse, so that she could no longer stand. The most careful movement of the legs caused violent attacks of pain in the heel and ankle; the entire region was swollen and apparently infiltrated with pus, which frequently welled out abundantly from the fissures. Latterly her general condition has become bad, more especially as regards sleep and appetite.

Both heels are markedly fissured, swollen and show numerous cracks extending down into the subcutaneous tissue. Over the ankles the skin is inflamed and œdematous. The entire calcaneal region and the phlegmonous areas are extremely tender. The diagnosis was chronic eczema with erysipeloid phlegmon and chronic septic infection.

Treatment.—I first made an attempt with local antiseptics, using compresses soaked in a 1 to 4,000 citrate of silver solution.

August 29. Slight improvement in the heels, but the phlegmons have decidedly advanced. There is increased weakness and headache. These symptoms of a general infection caused me to prescribe: Unguenti Credé grams 3, (45 grains), divided into three portions for inunction. The patient was instructed to rub in the contents of one package for twenty to twenty-five minutes upon the chest and back. 30th. After the very first inunction there was a diminution in the subjective difficulties. Inunctions every other evening were ordered.

September 5th. Marked subjective improvement after four inunctions. Pain gone. Sleep. The patient can walk without any trouble. The local lesions, more especially upon the right side, are visibly improved. The phlegmon of the right external malleolus has almost vanished. The left heel, where the septic process began somewhat later, is still inflamed, and there is pus there yet in the subcutaneous tissue. 9th. Patient has received seven inunctions, which he has borne extremely well. The general condition is excellent; the usefulness of her feet is nearly normal.

The results of the therapeutic experiment for which this second case may serve show the effectiveness of the internal silver medication in the treatment of chronic septic infection. Credé first called attention to the fact that these forms of chronic sepsis occur with far greater frequency than is commonly supposed.

Case III. Johana T., 53 years old. August 19, 1898. Six weeks before the patient burnt her forearm. About eight days after the injury there appeared on the dorsal side of wrist and

anterior surface of elbow-joint two large ulcerations, accompanied by infiltration of the adjoining tissues. The entire forearm became painful and swollen and the patient had to stop work. The abscesses were freely opened, but the trouble did not cease.

Examination showed marked swelling and redness of the entire arm up to the elbow. There were about fifteen furuncles, varying in size from a pin's head to a pea; most of them are in the acute stage, though a few suppurating foci were already retrogressing. The affected areas were very sensitive. The axillary glands were swollen. The general condition was bad; appetite, sleep and strength were impaired, and there was severe headache. The diagnosis was chronic multiple furunculosis, with chronic infection. The treatment consisted of local disinfection by dressings of 1 to 4,000 citrate of silver solution.

August 22d. Her general condition getting worse, and new septic foci continually appearing, I had recourse to the general silver treatment, and ordered the patient to use 3 grams (45 grains) of unguentum Credé in the right side for twenty-five minutes every evening. She took three inunctions upon three successive days. 25th. There is a marked improvement in the subjective symptoms. The local inflammatory symptoms have decidedly diminished and the mobility of the arm has increased. The furuncles are all retrogressing and there are no new ones.

September 2d. The general condition is excellent; the local symptoms have almost entirely disappeared and the mobility of both elbow and wrist is normal. 5th. The patient does her housework again. 9th. Ten inunctions in all have been taken; the patient is cured.

The excellent results obtained from the silver therapy in the two first recounted diffuse septic cases are quite equalled by the astounding curative results obtained from argentum colloidale in the third case, which was a typical one of circumscribed suppurating foci in the form of a multiple furunculosis. The effect of the internal silver antisepsis was so prompt that even after the third inunction only there was a complete standstill of the furuncular process, and after ten inunctions the patient's condition was so near the normal that the treatment was continued only for prophylactic reasons. My observations confirm the remark of Credé, that older disease cases require five to twenty inunctions. A proof of the reliability of the method of treatment by the internal silver medication is found in the fact that after its institution no further surgical measures were required on the furunculous nodules, and that the local relapses of this very painful disease ceased entirely.

I can sum up in the following conclusions:

1. In soluble metallic silver we possess a valuable remedy for the successful treatment of blood poisoning caused by septic infection, when the diagnosis is correctly made, and whilst severe secondary affections are still absent.

2. Internal silver therapy is suitable for both acute and chronic sepsis, and for furunculosis.

3. It is most energetically exhibited by means of inunctions with the unguentum Credé, in which the medicament is directly introduced into the circulation. In the blood the formation of the powerfully bactericide silver salts effects a general antisepsis and a disinfection of the entire organism.

To guarantee the quality of the preparation employed, I used, in every case, the absolutely reliable unguentum Credé, prepared by the Chemical Works of Von Heyden.

I shall feel the greatest satisfaction if my researches into the action of soluble metallic silver stimulate my colleagues both at home and abroad to a more extensive investigation of this new, non-poisonous antispetic specific for wound infections in both ordinary and military surgery.—Deutsch. Med. Woch., 1898, No. 40.

The L. V. R. R. Accident Cases.

LIST OF ARTICLES IN THE CASE AND THEIR USES.

(1.) Two Rubber Bands.—For stopping hæmorrhage. Apply on sound flesh above the wound. Draw tightly each time and encircle the limb until the whole bandage is used. Fasten securely. (2.) Six Assorted Muslin Bandages.—For holding dressings in place, assist in stopping hæmorrhage and hold splints upon fractured limbs. Wind around the injured part from below upward. (3.) Five Yards Sublimate Gauze.—A prepared dressing for open wounds. Always used to cover large wounds, applying wet directly to the wound. (4.) One dozen pieces of Absorbent Lint.—To be used instead of a sponge in bathing wounds. Always throw away a piece after using once. (5.) One ounce Styptic Cotton.—This cotton is permeated with a substance which stops small hæmorrhages. Apply directly to small wounds and hold in place with muslin bandage. (6.) One-quarter pound Absorbent Cotton.—This is for making compresses and to assist in covering a large wound. Do not apply directly to the wound. (7.) One bottle Sublimate Tablets.—These small tablets are to be dissolved in clean warm water, in the proportion of one tablet to a pint of water, in order to disinfect a wound and keep it free from infection. They are poisonous if swallowed, or the solution be drank. (8.) Two ounces Bicarbonate of Soda.—For burns and

scalds. One tablespoonful to a quart of water; saturate a piece of gauze and apply over a burn or scald. (9.) Four Surgical Needles.—To be used in closing small cuts or jagged wounds after thoroughly cleansing with the sublimate solution. (10.) Pair of scissors.—Used in cutting dressings, bandages, clothing, etc. (11.) Pair of Forceps.—Used for removing bits of gravel and to seize a bleeding artery while it is being tied. (12.) One bottle Carbolized Silk (three sizes).—To be used in tying a vessel when it is seen free and bleeding, in a wound; also for closing small wounds. Never replace back into the bottle any piece that has been used. (13.) Two ounces Green Soap.—This is perfectly bland soap, which should be used in cleansing an injured part around a wound. Apply and wash off with the pieces of absorbent lint. (14.) One Roll Rubber Adhesive Plaster.—For closing small torn or cut wounds after they are cleansed with the sublimate solution. It needs no heat; apply directly to the skin, which must be perfectly dry, however. (15.) One Pyramid Pins. (16.) Six Safety Pins.

RULES FOR TREATMENT OF THE INJURED IMMEDIATELY AFTER AN ACCIDENT, BY W. L. ESTES, M. D., CHIEF SURGEON.

1. Shock.—This condition usually follows every severe injury. The chief point is to restore heat to the body as soon as the injured person is put in a comfortable position. Do this by covering with heavy coats, previously warmed—if practicable. Cut off the shoes or boots and envelop the feet in a warmed coat or blanket. Give only small dose of whisky in hot water.

2. Hæmorrhage.—This follows shock and is rarely severe until reaction takes place. Too much stimulation increases hæmorrhage and for this reason it is best to give only a little stimulant, well warmed, and repeat the dose if reaction is delayed.

Bleeding is of two kinds: 1st, arterial, when the blood comes out bright and red and in spurts; 2d, venous, when the blood is dark and flows in an even stream.

A. To stop hæmorrhage, when the wound is large and the blood comes out in spurts. Apply the rubber band tightly just above the wound, previously raising the wounded part, especially if it be a limb. Be careful to put the band on uninjured flesh if the limb be badly crushed, and about three inches above the crushed tissues, else it would slip down and increase the hæmorrhage. Be very careful to see that the band be firmly hooked and fixed before leaving it. Small wounds, even though the hæmorrhage be arterial, require only a firm compress of the sublimated gauze placed immediately over the wound and bandaged tightly in place with one of the muslin bandages. It is best after this to bandage firmly from the extremity (hand or foot) upward to beyond the wound with muslin bandages.

B. Venous bleeding, which occurs when the wound is shallow (does not go deeper than the skin), as a rule requires firm pressure over the wound and especially below it. If the wound be quite small, put a wad of styptic cotton into and over it and bandage tightly in place and then apply a bandage from below upwards over and beyond the wound. If the wound be extensive, fill it full of sublimated gauze and then put a thick wad of absorbent cotton over it and bandage tightly from below upward.

C. Bleeeding from the head, if only the scalp is involved, may also be controlled by drawing the rubber band around the head, encircling it just above the eyebrows. This is very painful, however, and unless the bleeding be very severe it may be controlled by bringing the wounded or torn surfaces together and applying along the wound a thick layer of styptic cotton, and over this another layer of absorbent cotton and a tight bandage. It is well to pass the bandage under the chin if the wound be on the top of the head, as this holds it firmer and tighter.

3. Remove the clothing from the wounded part by cutting it away. Do not attempt to tear or draw clothing off, as this may further injure the wounded part. Always see the wound and know by your eye just what the nature of it is.

4. After Hæmorrhage has been Stopped.—The next point is to prevent the wound from being infected and thus prevent blood poisoning. To accomplish the wound should be cleaned if badly soiled. If soiled by oil and soot or dirt, bathe it gently with a small quantity of green soap and warm water. After it is apparently clean, wash it out carefully with a pint of warm water in which one of the corrosive sublimate tablets has been dissolved, using the bits of lint to do this. Then wet several layers of the sublimated gauze in a fresh solution of the same strength used in washing the wound and lay them over the wound and bandage in place with a muslin bandage. Always cover an open wound with a piece of gauze wet in the solution of corrosive sublimate (three tablets to a pint of water) before transporting the wounded man. Never allow an open wound to remain unprotected longer than the time employed in stopping hæmorrhage. Remember a soiled covering is worse than none at all, however.

5. Fractures.—If a bone be broken in any of the limbs the member should be firmly fixed before the injured individual be moved. If this be not done, great injury may result by the movements of the sharp fragments of the

bone while the individual is being transported. Any flat piece of smooth board or slat, broken or cut into strips long enough to reach beyond the two nearest joints will do. A bundle of twigs or stout straw may also serve when nothing else is to be had. Always put one of the improvised splints on either side of the limb, then tie a bandage over the splints at either extremity and in the middle. If there be a wound treat it according to the foregoing rules and then apply the splints, using some clean "waste" as padding or some strips torn from clothing. If there be no wound apply the splints over the trousers or sleeve. If nothing of any kind can be obtained to make a splint, tie the fractured leg or thigh to the sound one, or the fractured arm firmly to the side of the body, by a muslin bandage.

6. Compound fractures are fractures accompanied by a wound of the soft tissues at the point of fracture, so that the bone is exposed to the air. In these cases treat hæmorrhage and the wound according to the foregoing rules and then apply splints. If the bones project beyond the skin remember to bring them back into place by pulling the extremity in the direction of the displacement, never in the direction the bone normally should be, until the ends of the fragments are quite free from any over-riding. Be very careful always to cover these wounds with the wet sublimate gauze and bandage it on.

7. Burns.—Carefully remove the clothing by cutting it off, if the part be clothed, and apply immediately three or four thicknesses of the sublimate gauze wet in warm water, in which one tablespoonful of the bicarbonate of soda to the quart has been dissolved. As a rule never attempt to clean burns immediately after they occur. Cover the wounded part immediately as directed above and leave the cleansing to the surgeon afterward.

Extensive burns are attended by great shock as a rule and require free stimulation. As burns are very rarely followed by hæmorrhage, stimulants may be and should be given in considerable quantities.

8. Prostration from Excessive Heat.—In these cases (not sunstroke) the face is pale, lips colorless or blue, breathing slow and quiet, pulse slow and very weak. Place the patient on his back, with his head level with his body, and loosen clothing. Apply heat to the surface of the body and extremities. Bathe the face with warm water into which a little alcohol or whisky has been poured, and if he can swallow, give the patient an ounce of whisky in as much warm water.

B. Prostration from Drinking too much Ice Water when Overheated.—The face is red or even purple, the breathing heavy and irregular, pulse irregular. Loosen clothing, place on back with head slightly elevated. Give hot drinks, apply heat to the spine and the extremities.

9. Position in which a Patient should be placed after Injury.—Injuries to the head require that the head be raised higher than the level of the body. In all cases, if practical, lay the patient on his back with the limbs stretched out in their natural positions; loosen the collar and waistbands, and unless the head be injured, remember to have the head on the same level as the body. Do not bolster it up with anything.

Personal.

Dr. James A. Duncan has been appointed to the staff of the Toledo Hospital.

Dr. H. J. Connor of West Superior, Wis., has been appointed chief surgeon of the Eastern Railway of Minnesota, taking effect Jan. 1, 1899.

Dr. T. W. Huntington of Sacramento, Cal., who was for many years in charge of the Southern Pacific Railway Company's hospital at that point, has been elected assistant professor of surgery in the University of California.

Dr. James G. Hunt of Utica, N. Y., has been appointed division surgeon for the N. Y. O. & W. R. R. for 1899, making his fourteenth year of service. The Doctor's territory covers the Utica and Rome division and St. Elizabeth's is the emergency hospital at Utica.

Dr. A. F. Jonas, the chief surgeon of the Union Pacific, read a paper on "A Modification in the Operative Method for Talipes Equino-Varus" at the last meeting of the Western Surgical and Gynæcological Society and was elected a member of the executive board.

Railway Miscellany.

Railway Construction in the United States During 1898.

Not less than 3,018 miles of new railroad have been built in the United States during the year 1898. These figures are based on official returns received at this office, and indicate that the predictions made by the Railway Age nine months ago were not far wide of the mark. At that time work was just being started on the greater part of the mileage, and as it progressed it became more evident that our estimates would be realized when the final returns for the year had been received. During the first six months of the year 1,182 miles of new road were built, and the next three months 1,000 more miles were added, leaving but little over 800 miles to be completed during October,

November and December to bring the total up to 3,000 miles.

Had it not been for the almost unprecedentedly bad weather of the fall and early winter, which seriously retarded work in many localities, we should now be able to report a considerable excess of 3,000 miles. As we go to press tracklaying is still in progress or just beginning on a number of lines, which makes it impossible to receive absolutely complete returns until after the close of the year. This will make necessary some slight changes in the following figures, showing the mileage constructed by states, but it may be considered certain that the total will be increased rather than diminished when the final returns have been

TRACK LAID IN THE UNITED STATES IN 1898.

States.	Lines.	Miles.	States.	Lines.	Miles
Alabama	9	154	Montana	3	39
Alaska	1	120	Nebraska	1	.60
Arkansas	11	157.51	New Jersey	1	2.
Arizona	4	99.40	New Mexico	4	162.88
California	12	118.55	New York	7	43.95
Colorado	6	36.85	North Carolina	10	121.60
Connecticut.	1	6.75	North Dakota	1	77.50
Delaware	1	2	Ohio	5	91
Florida	5	50.80	Okalahoma Ter	4	147
Georgia	9	111.75	Oregon	2	58
Idaho	1	21.13	Pennsylvania	22	105.42
Illinois	5	12.98	South Carolina	2	16
Indiana	5	32	South Dakota	1	11
Indian Territory.	3	58.89	Tennessee	2	8
Iowa	3	48.65	Texas	11	182.93
Kentucky	2	15.40	Utah		39.40
Louisiana	9	158.35	Vermont	1	2
Maine	3	124.10	Virginia	4	50
Maryland	2	15.30	Washington	3	14.20
Michigan	10	97.30	West Virginia	6	38.50
Minnesota	8	250.01	Wisconsin	6	48.50
Mississippi	5	40.50	Wyoming	1	7
Missouri	7	119 68			
Total in 45 states and territories				222	3,018.38
Canada				14	427.28
Mexico				15	442.62

The new mileage of the present year is greater than that of any previous year since 1892, when 4,192 miles were built, and is 1,138 miles in excess of the new road added in 1897, when 1,880 miles were constructed. The following tables shows the construction of the last eleven years:

Year.	Miles.	Year.	Miles.
1887	12,983	1893	2,635
1888	7,106	1894	1,949
1889	5,230	1895	1,803
1890	5,670	1896	1,848
1891	4,281	1897	1,880
1892	4,192	1898	3,018

By referring to the table it will be seen that there are but five states in the Union that have built no new road during the year, namely: New Hampshire, Massachusetts, Rhode Island, Kansas and Nevada, although it is probable that the latter two may be represented when the final returns are in. Three states—Delaware, New Jersey and Vermont—have built but 2 miles each, while Nebraska has added less than 1 mile on a terminal line at Omaha. Thirteen states have built more than 100 miles each, these thirteen have built over 1,900 miles of road, and if we include Arizona, which has added 99.4 miles, it will be seen that nearly two-thirds of the new mileage of the country has been constructed in fourteen states.

Southern Pacific Hospital Association.

Many changes are impending in the Southern Pacific Company's Hospital department. Perhaps the most important is the building of a modern hospital in Sacramento, and the discontinuance of the old hospital in Sacramento, which has been for over thirty years the central hospital for their whole system. When built, this hospital was the greatest institution of the kind in the state of California. The Central Pacific division commences at Sacramento, and when the hospital was built in that city it was the most convenient point for railroad patients. The past 20 years have witnessed enormous developments in the Southern Pacific system as well as the Market Street Railway system in San Francisco. It has now been found advisable, for economic reasons, to abandon the old and antiquated Sacramento hospital for the one in San Francisco. The hospital building that is now in process of construction will, when completed, be one of the finest railroad hospitals in the country. In heating, lighting, ventilation, furniture and equipment it will follow the latest and most approved methods. Dr. Matthew Gardner, the accomplished chief surgeon of the hospital association, is taking personal interest in the work. Through long experience in such matters he has been of great assistance to the architect in developing the plans.—Phil. Med. J.

In some parts of South America it has long been the custom to employ women as conductors on the street-cars. The practice has now been taken up in this country by the Chillicothe, Ohio, Electric Railroad, Light & Power company, whose president, W. J. Myers, recently sent the Electrical Engineer quite a cheery letter on the subject. He says: "We could not afford to employ men, and we could not see why women would not make as good conductors as men. We keep them on duty ten hours per day, and pay them $4 per week, and they are proving themselves in every way competent and efficient. We were very particular in selecting them, and had no trouble in getting good applications and a great many more than we are able to employ. It gives us a very clean service, and we think that this will be a new field for the employment of ladies."

Daniel W. Getchell of Mansfield, Mass., the engineer who was responsible for the rear-end collision on the New York, New Haven & Hartford at Sharon, Mass., August 21 last, in which a number of passengers were killed, has been convicted of manslaughter and sentenced to two years at hard labor in the house of correction at Dedham, Mass. The court declined to send the convicted man to the state prison.

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TETANUS.*

BY EDWARD O. PLUMB, M. D., ROCK VALLEY, IA.

Nearly thirty-eight years ago I heard a professor in a medical college use substantially these words: "Gentlemen: I show you to-day a case of tetanus. If I could I would gladly explain to you the cause of this mysterious and fatal disease, and the connection between the punctured wound of the foot and the reflex nervous phenomena you see manifested." "When I tell you that more than nine-tenths of all patients with tetanus die, you will see that our treatment avails but little, while surgical procedures give but a faint hope of success." Had the good old man lived until to-day he would have seen the cause of this dread and then fatal disease, as well as the mysterious connection between the punctured wound on the foot and the reflex nervous phenomena determined "beyond a reasonable doubt."

The etiology of tetanus, as well as some fifteen other well-known diseases and pathological conditions has been definitely determined. The discoveries of Pasteur, Koch, Virchow, Lister and others in bacteriology, and Rokitansky, Wagner and their compeers in pathological anatomy have enabled us to see clearly what before was all doubt and conjecture.

The slow but sure advance of modern surgical procedure, call it what you will, asepis, antisepsis or simple surgical cleanliness, was the open door that stimulated research in pursuit of the microbes of other diseases with the most gratifying success. Tetanus has undoubtedly existed since the earliest history of man, and the founders of medicine partially describe symptoms allied either to tetanus or trismus, which is but a partial tetanus; it was, however, not until during the wars of the 18th century that the French surgeons, notably, Larrey, clearly defined its symptomatology. Nothing was added for more than a century when the microscope dispelled the doubt and mystery of its origin.

Personally, I doubt the existence of the so-called "idiopathic tetanus," as I shall explain when I come to speak of the etiology of the disease. There is undoubtedly a form of hysteria that simulates a mild tetanus. There must be a traumatism somewhere, perhaps so slight as to escape notice, whereby the tetanus bacillus has gained entrance. Injuries of the hand or foot, in case of the latter most frequently the traditional rusty nail, are responsible for more than one-half the cases of tetanus. Here let me digress to give my treatment for the injuries of this character, particularly punctured wounds of the foot. First, thoroughly cauterize the wound with some strong antiseptic, carbolic acid, tincture of iodine, or that compound of carbolic acid and camphor sold as campho-phenique. It must be plentifully applied on cotton wrapped round the end of a probe, incising the wound if required. Then soak and cleanse the part with an antiseptic solution, cover the wound with a pad of sterilized gauze, bandage lightly and keep dressing constantly moist with an antiseptic. The cauterizing should be done but once, but efficiently. The dressing should be changed daily and the wound syringed with an antiseptic. I have recently learned that this was substantially the method used by the medical staff of the World's Fair in this city.

While injuries of the extremities are the most prolific cause of tetanus, it may follow any traumatism. The extraction of teeth, hypodermatic injections, compound fractures, accouchment injuries, even the cutting of a corn, are all said to have caused it. Indeed,

*Read at the sixth annual convention C. M. & St. P. R. R. Srgeons, Chicago, Nov., 1898.

there is not a known injury, with the slightest abrasion of cuticle, that has not been said, and doubtless truthfully, to have been the forerunner of this terrible malady. In the past, it has followed amputations and other procedures of operative surgery, being particularly frequent after gunshot wounds and operations in military practice. Formerly it was next to hospital gangrene, more dreaded by military surgeons than any other complication. In the light of modern surgical science, post-operative tetanus, like hospital gangrene, should be a thing of the past. Remember I am now referring only to tetanus after surgical operations, not tetanus from accidental injuries, which from neglect and consequent infection may produce the disease at any time.

Race and climatic conditions seem to predispose toward tetanus. The dark races seem more prone to it than the Caucasian, while in hot climates it undoubtedly occurs much more frequently than in temperate. This rule, however, is not without many exceptions, as tetanus is not infrequent among the Esquimaux of the extreme north. In the last war between Spain and Morocco, ten per cent of the African soldiers were attacked, while only one per cent of the Spanish soldiery shared the same fate. Some localities seem to be more prone to the disease than others. Objection was made to Montauk point because of the alleged frequency of tetanus on Long Island.

The etiology of tetanus is no longer a question of doubt. As I said before, in regard to the cause of tetanus, as well as several other disease and morbid conditions, what we once saw "as through a glass darkly," we now, by the aid of the microscope, see clearly without doubt or cavil. The bacillus of Nicolaier is undoubtedly the cause of tetanus. Shortly before, Lister had proven the microbic organ of tetanus, demonstrating that in six years' practice of surgery under antiseptic methods he had but two cases of tetanus; and in those the wounds were already infected. In 1885, Nicolaier obtained from ordinary soil bacilli which inoculated into the lower animals produced tetanus. The next year Rosenbach demonstrated before a congress of surgeons in Germany that the bacilli of Nicolaier was identical with that of human tetanus. To Kitasato is due the credit of having separated, cultivated and isolated the bacillus of tetanus. His subject was a patient who died on the third day of a typical tetanus. He used the pus from the wound, the splinter of wood that caused it, and finally by care and a unique procedure, obtained a pure bacillus of tetanus and established its spore formation, prior to its becoming a bacillus, and finally reaching a spore-bearing stage, capable, under proper conditions, of reproducing itself in the original medium, without passing through animal tissue. His experiments show that they may be cultivated in any of the ordinary culture media, bouillon, preferably alkaline, gelatine and blood serum.

Being anaërobic, as are most forms of bacteria, they flourish most luxuriantly under hydrogen, oxygen not being necessary for their development. The bacillus of tetanus is telluric, its favorite and undoubtedly original habitation being the soil where it is doubtless widely diffused. The equine theory of the bacilli of tetanus; that the soil of localities frequented by horses is prolific in tetanus bacteria; and that, persons much around horses are peculiarly liable to the disease, is true to a limited extent. In one of the cases I shall cite, the infection was probably due to this cause.

The experiments of Kitasato and more recent investigators has proven another fact. That is that the bacilli of tetanus are extremely tenacious of life. They preserve and retain their virulence under conditions that would destroy almost any other microbe. I have not time nor space to detail the experience of these investigations. Suffice it to say, that ten hours' exposure in a five per cent carbolic acid solution did not destroy them, it took fifteen hours. The same of a one per cent solution of bichloride of mercury, it took three hours. Iodine and its compounds seem more destructive than any other chemical antiseptic. Yet it must however be distinctly understood that in a case of injury that is likely to produce tetanus, any antiseptic treatment of the wound must be given, not only thoroughly, but very promptly, to be of any benefit.

In regard to the symptomatology of tetanus little need be said. The period of incubation after the receipt of an injury varies from a few hours to a week or more. Perhaps ten days would, usually, be the extreme

limit. Contrary to the train of symptoms as detailed in the books, in at least two of the cases that have come under my personal observation a muscular spasm of the injured part, particularly a hand or foot, was the first noticed symptom. Then followed the rigidity of the muscles of the jaws and neck which have given the disease its ordinary name, lock-jaw. The other muscles of the trunk and lower extremities are gradually involved. The muscles of the arms come last and seem to be the least affected. There is usually an intense hyperæsthesia, which may be aggravated by external causes so as to induce a clonic condition of the spasms, which is very agonizing to the patient. Deglutition is almost always impossible from paralysis of the muscles involved. A whistling sound is caused by inspiration and expiration. As might be expected there is usually paralysis of the sphincters of the rectum and bladder, causing fæcal and urinary retention. Death usually ends the scene in two to four days. Death being caused from exhaustion, carbonic acid poisoning, from rigidity of the glottis or respiratory muscles, or perhaps cardiac paralysis. The risus sardonicus is strongly marked. I have also noticed an extreme contraction of the pupil caused probably by the involving of the third pair of nerves. The mind remains clear till a short time prior to death. The pulse and temperature vary greatly. In one case I recall they were both nearly normal till a few hours before death, when the pulse, weak and thready, reached 150 or over and the temperature 108. In another, the pulse was from 120 to 140 and the temperature 105 and over during the whole course of the disease, reaching 107.4 at death.

It may be laid down as an axiom that the longer the patient survives in tetanus the stronger are his chances of recovery. Few patients die after the ninth or tenth day of the disease. In cases that recover the improvement is very gradual, the symptoms disappearing in the same order as they appeared, and convalescence is usually much prolonged. A low temperature, slight involvement of the muscles of the trunk mark mild cases.

There is little likelihood of any other disease being mistaken for tetanus. Strychnia poisoning does undoubtedly produce tetanoid convulsions, but the history of the case, the marked clonic character of the spasms, producing perfect relaxation during the intervals, will clearly indicate the difference between tetanus and strychnia toxis. As I said before, the disease which is called tetany is either a mild form of tetanus or a tetanoid hysteria. In either case, the prognosis is favorable. I leave the question of the production of tetany from thyroidectomy and gastric lavage, to some other gentleman, as perhaps foreign to the subject under discussion. There is a limited field in experimental physiology open to the younger members of the profession.

The treatment of tetanus, in the past by drugs, per os, or hypodermatically, has been anything but a success. With the difficulty of deglutition, in nearly every case an impossibility, internal medication by the mouth has been largely barred. Rectal medication has been tried, as also hypodermatic injections of morphia, and some of the other alkaloids. The failures, however, have far outnumbered the successes, if successes they could be called. The most favorable results seem to have been attained by large doses of the bromides with chloral and cannabis indica. Inhalations of chloroform, not ether, may be useful even if it gives only a short respite. In my hands nitrite of amyl has proven useful. Indeed, every drug that has had any repute as a narcotic or antispasmodic has been used in tetanus, with about the same lack of success. The fact probably is that cases of so-called drug cures would have recovered as well without the drug medication as with it. The time may come when pharmaceutical chemistry may give us some active principle which, in connection with other and more scientific treatment, will be useful.

To summarize drug treatment, open the bowels with some cathartic, croton oil is good, perhaps the best, or the salines if the patient can swallow. I would say in this connection that I have used hypodermatically, a saturated sterilized solution of epsom salts with success. It should be injected somewhere in loose cellular tissue in the same locality as we would inject salt solution for collapse. Use the catheter as retention of urine is the rule. If the catheter causes spasm, and the bladder is full, aspirate above the pubes. I have twice successfully aspirated in that locality for

retention from apparently impermeable stricture. An ice bag to the spine may be used, and in one case I recall seemed to give some relief. The bromides and chloral by the mouth or rectum, morphia and chloroform seem to be the total of drug medication. In view of what we now know of the cause and origin of tetanus I need not say that with the simple procedure of excision of the wound, limited to a very few cases any surgical operation for tetanus is worse than useless. In regard to the local treatment of the wound, I reiterate what is done must be done as soon as possible after the receipt of the injury and done thoroughly. It has been recommended to pack the wound with iodoform, since like other anaërobic organisms, the bacilli of tetanus have the power of reducing the iodine compounds, and producing free iodine when in contact with the tissues containing them. The other recognized antiseptics would produce the same result.

I now approach a branch of my subject with much perplexity, and I hope if any gentleman present has had any experience in the line I am about to present he will freely do so and I hope give us a more favorable report than I fear I shall be able to do. I refer to the antitoxin treatment of tetanus. After nearly a year of careful search throughout the domain of medical literature, I confess I am almost as much in the dark as regards the real curative value of tetanus antitoxin as ever. If I could, most joyfully would I bear testimony to the same efficacy for antitoxin in tetanus as in diphtheria. That it has a certain value cannot be denied. The antitoxin treatment of disease is as old as the days of Jenner, the only difference being that nature had, by her own methods, provided Jenner with an attenuated virus, an antitoxin, if you please, ready for use. The hospital reports of the use of antitoxin in tetanus are conflicting and perplexing. The trouble with many members of the profession, mostly, not always, by any means, outside the hospitals and dispensaries, is that they report their successes and not their failures. This seems to be the case with antitoxin in tetanus. The manufacturers of biological products send out literature to the profession, which would lead the casual reader to suppose that the products they represent are almost, if not altogether, specific for the diseases to which they are said to be antagonistic. There seems to be, however, some grains of truth in their statements in regard to tetanus antitoxin. To a certain extent it is perhaps of value in tetanus. I have not time nor space to go into any detail of recorded cases of tetanus treated by antitoxin, but the evidence in favorable cases seems to be this: It is a cardinal principle in tetanus that the longer the patient survives, the stronger his chances of recovery. The recorded cases of so-called recovery from the use of antitoxin show that apparently it has the power of prolonging the duration of the disease and thereby giving the patient a chance of recovery. Understand me, I am by no means disparaging the use of antitoxin. Had I a case of tetanus to-morrow I would promptly and freely use antitoxin. If it did no good it would do no harm, and I can bear sad testimony to the futility of other treatment. The facts in regard to anti-tetanic serum seem to be that while there is as yet no positive evidence of its utility after the disease is fully established, it may by prolonging its duration, give the patient a better chance of recovery, and may be useful as a prophylactic where the infection and nature of the injury renders tetanus a possibility. If any gentleman present can give us any light on this branch of our subject, I hope he will do so.

Case I. In the early fall of 1865 after the war, while on frontier service, an Omaha Indian, a member of a battalion of scouts to which I was temporarily attached, while cleaning his horse's hoof with a piece of rusty hoop-iron, injured the back of his left hand between the thumb and forefinger. Nothing was done for it, until 36 hours after, he was, during the night, taken suddenly and severely with tetanus. I saw him about 4 a. m., and had him removed to the brigade hospital; and as he could not swallow bromide of potassium was given by the rectum, croton oil placed on the tongue, suppositories of opium and inhalations of chloroform were used but all to no purpose. About 8 a. m. the brigade surgeon and medical director of the department saw him in consultation, but suggested no change in the treatment except to bleed him to the extent of several ounces and apply blisters to the spine. Next day his comrades asked, and

were accorded the privilege of administering an Indian sweat. A "wickyup" was built and the patient, by means of hot stones and water kept in a dense vapor for several hours. As might had been expected, no benefit resulted and he died on the third day, comatose for some time before death from carbonic acid poisoning. Under the direction of the medical director, a post-mortem was made but nothing discovered save a slight congestion of the spinal cord.

Case II. In the early summer of 1873, I was called 40 miles from home into South Dakota to perform an amputation. I found my patient to be a young man who four days previously had injured his right leg in a mowing machine, severing the fibula and soft parts on the outer and posterior portion in the lower third. The tibia was also somewhat injured. A physician was called, who at the earnest solicitation of the patient and friends, made a foolish attempt to save the foot. After four days' treatment consisting of cold water applications, a moist gangrene of the foot and ankle supervened, and I was sent for to amputate. On the third day after the operation I was notified to come at once as there was something wrong, which the physician in charge could not determine. I responded, to find my patient in the throes of tetanus. He had already been given chloral and potassium bromide in large doses and as I had just received my first fever thermometer and hypodermic syringe, I gave him morphia hypodermatically and chloroform by inhalation. Temperature and pulse were normal until a short time before death, when the pulse reached 150, temperature 108. He died, however, in a few hours after I saw him.

Case III. In 1884, during one of the worst winter storms that swept over northwestern Iowa, I was called to my third case of tetanus, caused by the traditional rusty nail in the sole of the foot nearly a week previously, and [illegible] with the traditional fat pork. [illegible] extract of cannabis [illegible] as specifics [illegible]

Case IV. I saw no more tetanus for two years, when on the 9th of July I was summoned to a consultation over a case of tetanus, the result of an injury to the hand from a fragment of a paper-cap from one of those abominations, a paper-cap pistol, by a scion of young America celebrating the Fourth. The disease was mild, the spasms intermittent, the patient could readily swallow and there were intervals of almost complete relaxation. There was but a slight elevation in temperature. In view of the mild type of the disease, the parents were informed of a possible, if not probable, favorable termination, and the disease would probably be of several days' duration. Chloroform and morphia induced sleep during the intervals and seemed to prolong them, but of course did not prevent their recurrence. This continued for three days with no apparent change, when the friends thinking nothing was being accomplished, discharged the physician in attendance and sent for another practitioner. The paroxysms continued till the twelfth day, when they gradually subsided and the patient recovered.

DISCUSSION.

Dr. J. H. Rothwell: I have never seen a case of tetanus in the human being, but I have seen it in the horse. I was called by a farmer to see one of his horses that had a genuine case of tetanus. Just before I got there a farmer in the neighborhood had come in to see the horse, and he asked the owner of the horse what he wanted to send for a doctor for, and suggested that a nail be driven into the horse's collar and the animal would get well. I could not do anything for the farmer's horse. This man got a tenpenny rusty nail and drove it into the horse's collar, the animal shortened and relaxed his muscles, and, strange to say, he got well.

Dr. T. W. Nuzum: I had a little experience with my horse, he got a nail in his foot and had a genuine case of tetanus. We used morphine and bromides and chloral, but he died in thirty-six hours; we did not drive a nail into his collar, as was done in the case mentioned.

Dr. F. R. Garlock: Two years ago there was a terrible cyclone in the vicinity in which I reside (Racine), and the northwest part of the city was completely leveled to the ground. A lady who lived in that vicinity was struck on the back of the head and received a severe

scalp wound which ultimately healed completely. A few days thereafter she showed tetanic symptoms and finally died from the effects of tetanus. If this disease depends upon a microbe or some bacillus, why should it affect her after the wound was entirely healed and apparently as well as ever? There is something about tetanus that is not clearly understood by the profession.

Another case I saw was that of a fisherman. He had gathered his fish, was peddling them about the streets in a wagon, and by some means or other his horse started rather suddenly, the man fell, striking his spine across the edge of the wagon-box. He was picked up unsconscious with the spine injured. He also received some internal injury, although there was no break of the skin on the outside. He was taken home, and all the usual remedies were given to relieve pain, and sedatives administered, with no avail. Someone suggested to give him whiskey. Finally he was put on whiskey and kept thoroughly intoxicated for several days, and he recovered. That may have been similia similibus curantur, but it worked well in his case.

Dr. J. S. Roome: I was very much interested in Dr. Plumbe's cases of tetanus. I think it must be a disease that a country doctor does not often meet with. In thirty years of country practice I have never seen but one well marked case of tetanus. That was a girl about seven years old, who had her leg cut off with a mowing machine about two inches above the ankle-joint. The limb was entirely severed, only a few shreds of muscles and skin left. They lived several miles from town in a small house partially underground; the room was damp and musty, and the weather was extremely warm, it being in the month of July. I amputated the leg in the night; the only light I had was a smoky lamp; and my antiseptic preparations were not first class, and it was impossible to make them so. The only assistance I had was a young man I had brought with me from town, who gave the chloroform. The parents could neither speak or understand a word of English. I saw her the next day, two days afterward, and she appeared to be getting along nicely, and was suffering no pain and was quite cheerful. I saw her for every second day for about two weeks; the wound was healing nicely and everything looked favorable. On the fifteenth day after operation I was called; the man who came after me said he thought the girl was dying; that she was stiff all over. On my arrival I found a well-marked case of tetanus; the jaws were firmly set, so that it was impossible to pry them open. She was suffering severe pain, and all her muscles were very rigid. I gave her a hypodermic injection of one-eighth of a grain of morphine. I then removed the dressing, and examined the stump which was nearly healed and looked healthy. By this time she was under the effects of the morphine, and I succeeded in getting her jaws far enough apart so that she swallowed three or four spoonsful of water. I left them morphine powders, one-twelfth grain, one to be given every four hours. I also had the girl take five grains of bromide of potassium every six hours. On my return the next day I found her resting easy, but muscles still rigid. I changed my morphine for chloral, and continued the bromide. About the fifth day the muscles relaxed and she made a slow recovery under general tonic treatment. The wound healed with a good stump, and she is now wearing an artificial limb, and to see her on the street you would hardly know that she was wearing one.

Dr. S. A. Spilman: I consider this one of the most interesting papers we have had presented to the association. It deals with a very important subject. Occasionally we see cases of tetanus in country practice, and usually the disease occurs from the most trivial causes. I recall seeing two cases of tetanus, one from a nail in the foot, the other from a splinter. The case I saw during the past summer seemed to have been rather mild at first. This was a boy who was taken with a peculiar seizure in a barn-lot about a week after having stuck the splinter in his foot; they did not know what was the matter with him. He fell down and they helped him to the office. The next day his parents went visiting and they took the boy along with them, although he was having peculiar symptoms which they could not understand. He died about the eighth day, and I saw him the evening before death occurred. Of course the usual antispasmodics and opiates were employed without any effect. It was one of the saddest cases I ever saw. The little boy, about nine years

old, begged his father to kill him to relieve his suffering. I hope we will hear something with reference to the use of antitoxin in the treatment of cases of tetanus. It was not used in this case. I shall be glad to hear any favorable reports from its use in this disease.

Dr. Nelson A. Drake: I wish to place on record in connection with this discussion two cases in which I resorted to the use of antitoxin. The first case was a girl about thirteen years of age, who had stepped upon a rusty nail in a board, and the negroes said that if a nail was driven in the other side of the board the girl would not have tetanus. Negroes know something about tetanus. The next day after she had stepped upon this nail she went to a picnic, and about one week from this time her jaws began to get stiff, and I was called to see her; I at once used antitoxin. She was very sick for some time, and I think, during the whole course of the treatment we used four bottles of antitoxin. It was a very interesting case and was seen by several other physicians. She made a slow recovery.

A short time after having seen this case, a negro was sent to the city hospital with all the symptoms of tetanus, and antitoxin was used in his case, and he recovered. I have had several cases of the disease among white people, and never a recovery.

Dr. W. S. Caldwell: I have seen several cases of tetanus from time to time. I recall the case of one man whom we treated with large doses of chloral and cannabis indica. He recovered. I saw, with a professional friend of mine, Dr. Johnson of Savannah, Ill., a boy who had received what we thought was an insignificant injury of one of his toes, and he developed all the symptoms of the disease. We used antitoxin in his case and it did no good. I had another case of a man in Iowa who had an insignificant looking abrasion of the toe, and he paid no attention to it. We used antitoxin without any avail; both of these cases died. I believe the consensus of opinion is that antitoxin is absolutely no good after the tetanic spasms are present. The French surgeons discussed this subject before the Academy of Medicine of Paris. In all injuries, where a wound is infected with dirt from the street, or the kind of dirt or filth from which we get tetanus, they commence the use of antitoxin as a preventive measure, and of the hundreds of cases which they thought were of the character that would likely develop tetanus, none of them had the disease. But, as I have previously remarked, the consensus of opinion of the best men who have studied this subject is that if antitoxin is to be of any benefit whatever, it must be commenced before the onset of the convulsion, and it is no good whatever after that.

Dr. J. W. Kester: Some ten years ago I was called into the country to see a boy who had stepped upon a nail, and at the time I saw him he had well developed tetanic spasms, with opisthotonos, his jaws were firmly set; he was a great sufferer. I ordered the foot to be placed in a large pail of hot water, and it was not taken out for two or three days, the water being kept as hot as could be borne all the time. At the end of this time the tetanic spasms had disappeared, and the boy recovered. The water was hot enough to parboil, literally speaking, the foot. There was a dermatitis which extended to the knee.

Another case I saw was a boy who was shot through the second toe, breaking the bone, the ball coming out at the ball of the foot underneath the skin. On the ninth day after he was shot and was up on crutches, he complained of something being the matter with his jaw. On Saturday at 11 o'clock, the tenth day, I was sent to see him. I found him doubled up with tetanic spasms. On examination of the wound nothing could be seen except the wound of entrance and the wound of exit made by the ball. The boy's jaws were firmly set. I enlarged the wound from entrance to exit; gave him chloral and bromides, but nothing would control the spasms except chloroform. This I gave until his death, which occurred at 6:30 in the evening.

Dr. H. K. Whitford: While I do not pretend to know very much about tetanus, I wish to call attention to one thing that has been overlooked in the discussion, and that is the use of spirits of turpentine before tetanic symptoms develop. I have been engaged in the practice of medicine for forty years, and when a person comes to me early with a wound of the foot, I advise the application of spirits of turpentine, and I have never had a case of tetanus following any wound when it was used primarily. There are two men living at Elgin

to-day who both had tetanus, having recovered under very simple treatment. I gave each man hydrate of chloral, fifteen grains every three hours, enough to keep them under the influence of it, and applied spirits of turpentine to the wound and kept it up. I believe in one case I applied a poultice of beech leaves and used a little hydrocyanic acid, and kept it over the wound, and the patient got well.

I met a physician a short time ago who claimed to have a sure cure for tetanus, which consists of a drachm each of fluid extract of belladonna, fluid extract of conium maculatum, and fl. ext. of cannabis indica; the patient is given from two to six drops every two or three hours. In one case in which thirty drops of this mixture was given in three days, the patient got well. The use of spirits of turpentine as a preliminary treatment, applied to the wound, can be recommended very highly. We are sure of one thing—I am, at least—that tetanus is produced at the point of irritation of the periosteum, and if you can relieve this irritation or spasmodic condition, it stops the reflex action from this point of irritation, which is the true cause. If there is anything that will reach the irritation, spirits of turpentine will do it.

Dr. Plumbe: Experiments have proved that a microbe is the cause of tetanus. It exists in the soil, as was demonstrated by the experiments of Rosenbach, and stated by him before the Congress of Surgeons in 1884. He also produced tetanus in the lower animals by the injection of the tetanus bacillus.

As regards the local treatment of the wound, I am an enthusiast and a firm believer in the microbic theory of the disease. I believe the time is coming, although I may not live to see it, when the microbic origin of almost all of the known diseases will be definitely determined. I can count but fifteen diseases that are not microbic in origin. We know what the cause of malaria is; we know what the cause of yellow fever is; we know the cause of diphtheria. No man in this room can accurately diagnosticate a case of diphtheria unless he sends a culture from the throat to be examined. The bacillus of tetanus was obtained from the dust and dirt of the streets, and after the system has become infected with this bacillus, I do not believe any local treatment of the wound will be of any avail.

With reference to the remarks that have been made as to antitoxin in the treatment of this disease, the consensus of opinion of the profession, particularly those who have thoroughly studied the subject, is that after the tetanic symptoms are fully developed, antitoxin is practically useless as a curative measure, it is useful as a prophylactic measure. I have investigated this subject for a year or more, and I firmly believe that every day after the ninth or tenth day a patient with tetanus increases his chances of recovery that much, and any local treatment of the wound is worse than useless. The same with medicinal treatment, it has been a failure; patients do as well without as with medicinal treatment.

POTT'S FRACTURE. A CASE WITH COMPLICATIONS.*

By J. E. Luce, M. D., Chilton, Wis.

It is not my purpose to present in this paper a complete history of Pott's fracture and its complications, in all the details, as it would require too much of our time, besides our text books have such accounts fully written out which we may read at our leisure, but instead, I wish to make a few general remarks about this fracture and its complications, and then report the history of a case that fell to my lot to treat.

Pott's fracture (or railroad and street-car fracture as it is often called, on account of its being caused by jumping from such cars while in motion) is a solution of continuity of the fibula at a point situated from two to three inches above its inferior extremity. It may be simple, compound or comminuted, and is generally, but not always, attended with either a partial or complete luxation of the ankle-joint, which is the most frequent complication. In speaking of the dislocation we may consider either the bones of the leg in relation to the foot or the reverse. In my paper whenever I refer to the dislocation it will mean the tibia compared to the foot. The tibia may be dislocated forward and inward, backward and outward, and at intermediate points, depending altogether upon the force and external circumstances producing the fracture. In addition to the dislocation there are other com-

*Read at the sixth annual convention C. M. & St. P. R. R. Surgeons, Chicago, Nov., 1898.

plications as fracture of one or both malleoli, of the tibia, injury of the peroneal vessels and nerve, injury of the muscules, tendons and all the soft tissues in the immediate region of the fracture.

Pott's fracture is most frequently due to a force impinging upon the bottom of the foot, which suddenly abducts or adducts it, but generally abducting it. It may also be caused by direct force striking the fibula two or three inches above its extremity, the inner side of the leg being supported at the time. Lastly it may be caused by crushing force, as is seen in railroad wrecks and other accidents. Hamilton says that "in a record of forty-eight cases he was able to ascertain the cause satisfactorily in thirty-two, of which number six were the result of falls directly upon the bottom of the foot, but which were probably accompanied by a twist in the foot, even of a slip of the foot in walking on level ground, or on ground only slightly irregular, and fifteen of direct blows." When the fracture is caused by force abducting the foot the internal lateral ligament is first put upon the stretch, and the force continuing either the malleolus where the ligament is attached fractures, or else the ligament ruptures, in either case the force then expends itself by the astragulus coming in contact with the external mallelous and continuing produces a fracture of the fibula about three inches above its extremity, at the same time a portion of the external lateral ligament may be ruptured as well as the ligaments which unite the tibia and fibula. The deformity in this form is very marked, viz.: Foot strongly everted, lower end of tibia projects inward and forward, while the lower tip of the external malleolus projects outward and the superior end of the lower fragment lies close to the tibia, making a very marked depression at the point of fracture.

When the fracture is caused by a force adducting the foot the external lateral ligament is put upon the stretch, and the force continuing draws the external malleolus inward and either ruptures the ligament or produces a fracture at the weakest point of the fibula, or both conditions may result. In this form the symptomatology is very different. The foot will be inverted, and if the case is complicated with a dislocation the tibia will project outward and either forward or backward. The external malleolus will not project so prominently as in the other form and the depression at the point of fracture is not so noticeable. A careful study of the symptoms will decide whether the foot was abducted or adducted in producing the fracture. With these general remarks I shall pass to the case in question.

On December 23d, 1897, at about seven o'clock P. M., I was called to see Mr. T., residing about five miles from Chilton, who had received an injury of his left leg. Mr. T. at the time of the injury was 30 years of age, in good health, weighing 204 pounds and possessed very little adipose tissue. Upon my arrival I obtained the following facts: Mr. T. and his hired man were hauling gravel from a pit. After loading both teams his man drove out of the pit with his load, while Mr. T. thought that he would put on a few shovelfuls more. The place where they were getting the gravel was an excavation under a bank of earth about two feet in thickness. Mr. T. was resting on his right knee with the inner side of the left foot forward in the excavation, when a large portion of the earth, weighing about two tons, broke away and the sharp frozen edge caught his ankle on the inner side, adducting the foot and holding him fast. The hired man hastened to the rescue, and after a short time he was liberated and assisted to the load of gravel, on which he rode, driving his own team. After getting home he was put upon a bed and the foot washed off. I found the following injuries: Fracture of the fibula about three inches above its tip, partial dislocation of the tibia outward and slightly forward, and an open wound, extending from the front part of the ankle to the tendo Achillis, a length of five inches, with all the soft tissues severed, including the internal lateral ligament. The wound gaped nearly three inches, and when the foot was straightened the malleolus protruded through the wound. The edges of the skin were very much bruised and ragged, the ankle and lower portion of the leg were much swollen, and altogether it certainly did not present a very inviting aspect.

After explaining the nature of the injury and the probable outcome, I told him that I would prefer a consultation. He replied that "as times were hard he would rather that I get along alone if I possibly

could." I informed him that he might bring suit for malpractice, and that was the main reason why I wanted consultation. He assured me in the presence of witnesses that nothing of the kind would ever occur, and that I should do my best and he would be satisfied. Again washing off the foot and wound with a 1-2000 bi-chloride solution, I made extension and counter-extension to overcome the dislocation, which was easily accomplished.

After getting the parts in good position I carefully trimmed all the ragged and bruised edges of the skin and ligaments. The internal ligament had torn edges nearly one inch in length, which had to be cut away, leaving it so that it could not be sutured. The vessels and nerves were intact. Again cleansing with the solution I put in deep sutures the entire length, leaving a small place near the tendo Achillis for drainage. A dressing of iodoform gauze and borated cotton was applied and the leg placed in an easy position until a fracture box could be secured. On the following day, as there was considerable oozing, the wound was dressed and placed securely in the box. This extended from the foot to midway between the knee and hip, it had a piece cut out for the heel, and a foot-piece placed at an angle of about 35 degrees. The sides were made of thin material, thus allowing it to be expanded or contracted at will. The box was kept level by placing a wide board under it, and small bands of cloth encircled it, which could be tightened or loosened.

This treatment was continued for about ten days when the sutures were removed. There was some suppuration but not extensive, the edges had united quite well, but there was still great swelling and pain, especially on the fibular side and in the region of the fracture. The temperature ranged from 100 to 102 degrees Fahr., and the pulse from 90 to 100. Irrigation of the wound with a 1-2000 bi-chloride solution was performed previous to each dressing. The treatment after removal of the sutures was the same with the additional treatment of bathing the leg nearly to the knee, in water just as hot as the patient could stand it, for about thirty minutes. There was great swelling, pain and redness on the external aspect, and I feared that we would have to open the joint near the external malleolus. After using the hot baths for eight or ten days well marked improvement took place. The hot water was continued for about two months, and at the end of four weeks passive motion was commenced and continued daily thereafter.

The suppuration entirely ceased at the end of five weeks, and the box was removed at the end of the sixth week. The fever continued for five weeks, ranging from 99½ to 101 degrees Fahr., pulse about 90 to 94. He remained in bed for eight weeks, when he began to get around with crutches, which he used for about three months. He then laid them aside and began to use a cane. He now gets along without a cane unless he walks three or four miles. He does most of his farm work, except that which requires excessive walking.

The circumference of the ankle is still 1½ inches larger. There is little anchylosis or pain, and in time he will undoubtedly get along without a cane. At the time he got out of bed he weighed 140, at present he weighs 190 pounds, and walks with only a slight limp.

DISCUSSION.

Dr. J. H. Rothwell: The paper of Dr. Luce is a very interesting one. It deals with a very important subject, and I have just finished treating a case which is very similar to the one he reports. A young man was driving a horse, which ran away, and the young man sustained a fracture of the fibula about an inch and a half above the malleolus, also tearing the lateral ligaments on the inner side, and fracturing the tibia just above the malleolus in a slanting direction down into the joint, making a compound fracture over the fibula. I dressed the wound carefully, applied cooling lotions to prevent inflammation as much as possible, strapped the limb with rubber adhesive plaster except over the wound, and allowed the patient to be up and around. His foot was never perfectly immobile. At the end of ten days, when the wound had healed sufficiently, I applied a silicate of soda dressing and turned him loose, with a small opening in the side for examination at the end of a week, if necessary. This was about six weeks ago, and the young man is walking on the foot now, he was not kept in bed a day. The advantage comes in not placing these patients

in bed, no matter whether we have a compound fracture to deal with or not. Healing takes place quicker. Place a man in bed with a compound fracture, put the fractured limb in a box, or any other apparatus, and it requires much longer for healing to occur.

Dr. I. K. Gardner: There is one practical point in the paper that I wish to speak of, and concerning which I hope the Doctor will dwell upon when he closes the discussion. If I understand him correctly, he said he placed the limb at an angle of 35 degrees, placing the foot in relation to the long axis of the tibia. The trouble I have had in these cases is this, that if I did not watch carefully when the permanent dressings were removed, I could not get the heel to the floor. This does not obtain necessarily with Pott's fracture so much as in a case where an immovable dressing is applied. In a recent case in which I removed the permanent dressing, I laid special stress on the fact that the foot must be kept at right angles to the long axis of the tibia, but my instructions were not carefully followed, and as a result the man will have two or three months of tip-toeing around before he can get his heel on the floor, and it is going to delay matters.

Dr. W. S. Caldwell: There is one point that occurred to me in connection with this paper, and that is disinfection of the parts with bichloride of mercury. For some years I have made it a rule never to touch a wound at any time with bichloride of mercury, absolutely and positively. If you use solutions strong enough, in my opinion the process of repair is hindered. We have a surgeon in Freeport who is a bichloride of mercury man. We did an Alexander operation not long ago; I disinfected my side with a two and a half per cent solution of carbolic acid, and he disinfected his side with bichloride of mercury. My side healed absolutely and positively without a drop of suppuration, and his side suppurated. Outside of disinfecting the skin or the hands, when we are doing an operation, bichloride of mercury has no place in surgery. If I make a cut in the skin of any kind, I never close it until I have mopped out with a two and a half per cent solution of carbolic acid. Now, you may tell me that if we are perfectly aseptic in our procedure, that kind of practice is not necessary. That is undoubtedly true, but we are never positive that we are entirely aseptic.

Dr. E. Steiger: In such cases as those under discussion we have more or less contusion of the soft tissues, and to re-establish the circulation is one of the primary necessities if we wish to have primary healing take place. The point I wish to make in connection with the paper is this: that I would not dare to follow the example of the gentleman by using adhesive plaster in the manner he described. It seems to me an adhesive plaster dressing will suppress circulation; it may produce sloughing, more or less, and there is danger where there is any contusion. We will not have re-establishment of the capillary circulation. Then, too, adhesive plaster is a local irritant, and we have to be exceedingly careful how we use it. I believe that we can get along with hot water dressings and the usual treatment carefully carried out. We may use a Bavarian or other splint, or apply plaster-of-Paris so as to keep the fragments in apposition, and then as soon as we have a little support, the patient can walk with a crutch or a cane.

Dr. S. A. Spilman: This is an interesting topic to me, because I have had some singular and not always pleasant experiences with these injuries. I have in mind a case of railroad injury in which the ankle-joint was entirely torn open, the case being that of a fireman. The engine was overturned. The foot was dressed with the sock on it. I kept pouring water on the foot, and some hours afterward I dressed the wound with bichloride of mercury, resorting to irrigation, put in a little iodoform gauze, sewed up the wound, put the foot in a splint, and sent the man to Des Moines where he was cared for. The foot was then let alone until ready to remove the splint. In this case the injury was severe, and while my treatment may not have been right, the result was remarkably fine. A short time afterward I had the case of a brakeman who simply turned his foot and sprained his ankle. He went to bed at midnight, and got up the next morning with a painful, swollen ankle. He came back to our town and I cared for him. In this case I resorted to through and through drainage of the ankle-joint, let out a good deal of pus and synovial fluid, and

finally got a pretty good result. With reference to carbolic acid or bichloride of mercury, in my opinion, if we have a clean wound, the worst thing we can do is to lower the vitality of the parts with a very strong solution of either one of these agents, and at the present time I do not use either a strong solution of bichloride of mercury or of carbolic acid, but sterilized water or boracic acid. I do not think we can account for the reason why some trivial injuries will result disastrously, while some serious ones terminate so favorably.

Dr. F. R. Garlock: I would like to ask the essayist how much shortening he had in his case of Pott's fracture of the ankle, whether there was any or not, and if so, if the anchylosis was sufficient to require placing the foot at an angle of 35 degrees in order to reach the ground.

Dr. A. R. Law: I fully coincide with Dr. Caldwell in regard to the use of bichloride of mercury solution. I use it in amputations, and generally I apply but one dressing, removing it at the end of four or five weeks. I use a solution of bichloride of mercury of from five to ten thousand.

Dr. E. O. Plumbe: I want to say a word or two with reference to bichloride of mercury and carbolic acid. It is like our discussions of ether and chloroform, we never will settle the matter. I will say in regard to Pott's fracture, that any of the gentlemen who practiced before the days of antiseptic surgery know that these were considered serious fractures, liable to require amputation at any time. I recall the case of a section laborer who was injured in 1871, immediately after I became connected with the Northwestern, Sioux City and St. Paul Railroad, now the Minneapolis and Omaha. I was the Company's local surgeon, and was called to treat the case. The man had a severe Pott's fracture with open ankle-joint. I dressed the fracture as well as I could, sent the man to St. Paul to Dr. Murphy, who was then the chief surgeon of the road. He treated him in the hospital for three or four months, and finally had to amputate the foot, and then he sued both the railroad company and Dr. Murphy and myself for $10,000.00. The result of this damage and malpractice suit was that the jury decided in our favor, but gave $2,000.00 and costs against the railway company as personal damages. This case illustrates, if nothing else, the value of antisepsis in the treatment of Pott's fracture, as anybody who practiced before the days of antisepsis can readily imagine.

Dr. Luce: In my case we must consider the great bruising of the skin and tissues around the joint, and especially the ligament, most of which had to be cut away. It was an open joint, and nearly one-half of the tissues around the lower part of the leg were broken asunder. The scar is over two inches long. Considering the condition of the parts, I could think of no better treatment than that which I carried out. I have made use in cases of ordinary Pott's fracture of a fracture box, placing the limb in it until the swelling had sufficiently subsided, then applying a plaster cast, open in front and behind, one can keep it as tight as he desires with bandages. But this was out of the question in the case I have related, this patient had to be treated daily, and I do not see how the parts could have been brought into proper position in any other way than I have stated. I could press the borated cotton along the outer edge of the foot except right over the wound, so as to keep the fragments in proper position. As a support, I see nothing that would really take the place of the fracture box in my case. If there is anything the gentlemen can suggest which is better, I will be glad to know it. I had a consultation with a professional friend, he concurred with me in the treatment, and left the case under my care.

In regard to the angle, I do not know as I can give any reason more than this: Before I made this box, I put the foot in an easy position and noticed that it was at an angle of about 35 degrees, and it was done as much for convenience as for anything else. So far as the use of bichloride is concerned, I can only say that in my hands I have found it to be superior to other antiseptics. I do not say it is the best, but I like it best. As far as shortening is concerned, after the dislocation was reduced I found no shortening whatever.

In all amputations, remember that the loose muscles retract more than those which are attached to the bone. Hence it is better to sever the loose muscles first and the attached ones next, so that the ends may be of equal length. —Int. J. Surg.

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THE USES OF THE LIGAMENTUM TERES.

Like so many other structures in anatomy, this so-called round ligament is a misnomer, for it is not round, but a flattened or prismoidal band, and is not a ligament at all, properly speaking. As regards its functions, many opinions have been offered and much ingenuity has been exercised in endeavoring to solve the problem.

At first it was thought to limit adduction and rotation outward when the leg was flexed. This view, however, fell to the ground when it was found that if the capsular ligament was intact the motions alluded to were slighter in degree than if the capsule was opened, leaving the round ligament to stand the strain. Gerdy thought it acted as a suspensory of the femur from the trunk.

Several authors—Henle, Cruveilhier, Luschka, and especially Sappey—looked upon this structure as a fibrous canal which protected the blood vessels on their way to the head of the femur. The last author states that it contains two or three arterioles going to the femur and several venules returning from it, as well as nerves. "So many precautions taken by nature," he says,[1] "seem to indicate the importance of this little vascular apparatus, which injections, even coarse ones, easily penetrate." Hyrtl combatted this view, claiming that in his injections the arterioles turned back before entering the bone. But Hyrtl's assertions have been proven to be partly incorrect by Luschka, who found the vessels passing into the femoral head, though not constantly, for they are wanting in about one-third of the cases.

It has been thought that this "ligament" might act as a cushion. For instance, Tillaux believes it may break up the shock transmitted to the acetabulum by falls upon the great trochanter, jumping, etc. The great objection to this view is that the sphere made up of the femoral head, being of the same radius as the cotyloid cavity cannot come into contact with the excavated part of the acetabulum without first bursting the cavity at large.

The true nature of this ligament is shown by comparative anatomy, for we find that in many mammals and birds it is partly muscular and largely developed. Thus Bland Sutton tells us[2] that in the ostrich, the ligamentum teres is dense and strong, containing a large quantity of yellow elastic tissue and sometimes measuring three-fifths of an inch across. The ambiens muscle (which in birds corresponds with the pectineus) is connected with it by fibrous tissue. In an ostrich chick Sutton found the pectineus and the ligamentum teres in direct continuity. Moser shows that in the course of embryonic development the ligamentum teres of man presents the various stages which it has undergone to reach the interior of the joint; at first capsular, it rests on the articular surface of the capsule, remaining sessile for some time before becoming loose, as in the adult.

Even in the adult traces of its external origin are to be seen, for Amantini has pointed out the constant fold in the synovial membrane on the lower side of the neck of the bone, which he calls the pectino-foveal, is the

1. Anatomie Descriptive, 1888, I, 681.
2. Ligaments, Their Nature and Mosphology, 39.

remnant of a pubo-femoral muscle, of which the ligamentum teres is the tendon.

It is evident that a so-called ligament which is wanting in many animals, even such heavy ones as the rhinoceros and elephant, in one of the man-like apes (orang) and sometimes in man himself, cannot be of great importance. It is to be looked upon as one of the many vestigial structures which is gradually atrophying and is on the way to total disappearance.

Translations.

Trephining in Traumatic Epilepsy.

By Dr. Crickx of Brussels.

[*Continued from page 452.*]

February 15, 1897, we dissected up a large periosteo-musculo cutaneous flap; the surface of the bone was depressed and mammillated. A button of bone was removed by the trephine and the rest of the depressed area was removed by gouge forceps. Under the dura was found a gelatinous mass, below which the brain, covered by pia, was pulsating and appeared normal. The pieces removed were thinned in places.

The day after this intervention the patient responded more rapidly and clearly. Two days after the first operation we reopened the wound. Adhesions had formed between the flap and the dura. The wound showed nothing in particular save a very small hernia where the pin of the trephine had penetrated the brain. The subsidence of the brain, which was very marked after the first operation, was no longer manifest. A plate of aluminum was fastened to the skull, covering the large defect, and the wound closed again after freshening the edges. Aside from a little pain in the wound and œdema of the right eyelid the after course of the second operation was uneventful. The wound healed by primary union and the patient presented a more intelligent aspect and talked with his neighbors; he answered slowly but clearly; his appeite was good and he slept soundly.

On March 4, nineteen days after the trephining, the epileptic attacks began again with increased frequency. The orbicularis palpebrarum was spasmodically contracted, especially on the right, at the beginning of the attack, and this spasm persisted, even after the epileptic attack was over.

On March 10, the situation becoming aggravated, the wound was reopened again, the aluminum plate removed and a large opening made in the dura, which was adherent to the brain. The cerebral convolutions did not appear altered, save above and in front, where for an area about as large as a twenty-five-cent piece they presented a yellowish coloration like a lipoma. The pia was œdematous toward the bottom of the wound; elsewhere it was reddish. The foot of the second frontal convolution, which was easily recognizable, was decorticated. At the end of the operation the brain, which at first filled up the opening in the bone, receded and the yellow coloration alluded to disappeared. The adhesions between the dura and brain were loosened and the former sutured with silk. The skin flap was simply laid back in place without sutures.

The results from this new intervention were absolutely nil; the intelligence appeared still lower and the attacks kept up their frequence and intensity. From March 16 to April 11 the attacks ceased and the patient left the hospital. Four days after returning to his home the attacks became extremely frequent, then disappeared again. The attacks at present are much less frequent than before the operation; the intervals vary from three to six weeks. We saw the patient a few days ago and found the scar still a little red; pressure on it caused no symptoms.

The result of the operations, evidently is not very brilliant. The only relief obtained is in the infrequency of the attacks. Before operating they occurred daily, but now only at long intervals, besides not lasting so long. This amelioration in the frequency has greatly lessened the mental hebetude of the patient. Lastly, the complete innocuous character of the operations must be noted: The resection of the gray substance was not followed by any appreciable symptom.—(Ann. Soc. Belge de Chirurgie, 1898, p. 295.)

Before giving ether to patients suffering from catarrh of the nasal passages, wash these out with an alkaline solution. This will, by cleaning out the secretions, allow much easier breathing, and hence increase the facility with which anæsthesia can be induced.—Int. J. Surg.

Medico-Legal Notes.

Not Responsible for Acts of Physician.

On the appeal of the L. & N. R. R. Co. vs. Foard, a personal injury case brought by Foard against the company, the latter insisted that the trial court had erred in permitting the patient below to prove by himself that the attending physician who was furnished by the company to treat his injuries, sustained in its service, was negligent in his treatment of the wounds, and that by reason of this bad treatment his leg had to be amputated for the third time. With this contention the Kentucky Court of Appeals agrees, holding that the admission of this testimony was improper. It says that the company was in no way responsible for the acts of the physician, or for the neglect of the plaintiff, unless it were shown that the company was careless and negligent in his selection and that he was incompetent. It maintains that in the employment by a railroad company of its surgeons to attend the persons injured by its trains, the relation of master and servant and principal and agent does not exist; and that if the company is careful and selects suitable surgeons, it is not responsible for their neglect or malpractice. In this case there was no pretense that the company was careless or negligent in the selection of this physician and surgeon, or that he was in any way incompetent, and consequently for the reasons stated, the court insists that the plaintiff should not have been permitted to prove the misconduct, negiect or maltreatment of the physician in this action against the railroad company.—Jour. Am. Med. Assn.

Dr. Walter N. Courtney, chief surgeon of the Northern Pacific Railway company at Brainerd, has been granted a new trial by the supreme court in the suit for malpractice brought by Margaret K. Martin. The case attracted interest generally, the jury in the trial court giving a verdict for about $1,200.

The defendant was in charge of the Northern Pacific sanitarium at Brainerd. May 24, 1895, Joseph A. Martin had a foot crushed by a locomotive and the toes were amputated at Superior, after which he was taken to the sanitarium, remaining until July 16, when he returned to his home, which was at Brainerd, and was still treated by the surgeon of the sanitarium, his death occurring in September. On the trial of the case, Dr. Camp, a witness called by the plaintiff, Martin's widow, testified that he regarded the treatment as correct and proper. Two other experts of seventeen and twenty-two years' experience testified that the deceased had been treated according to the proper rules of surgery, these last being witnesses called by the defendant. Dr. Gray, called by the plaintiff, a physician of the homœopathic school (Courtney being of the allopathic), testified that the treatment was unprofessional and in violation of sound surgical policy. The case in the lower court being decided for the plaintiff and a new trial denied, it came on appeal to the supreme court. Judge Mitchell, in writing the opinion, said: "If the defendant can be found guilty of malpractice from the evidence in this case, it would be unsafe to practice surgery; it is not merely a question of money but of reputation, and the court does not think the defendant should stand condemned for all time as incompetent upon the evidence disclosed, without at least submitting the question to one more jury of his countrymen." The syllabus follows:

In an action for malpractice a physician or surgeon is entitled to have his treatment of his patient tested by the rules and principles of the school of medicine to which he belongs. The question of the competency of a witness to testify as an expert is one exclusively for the court, and all the evidence as to his competency should be received and considered by the court before permitting the witness to testify.

In this case the preponderance of the evidence against the verdict was so great that it was an abuse of discretion not to grant a new trial and submit the case to another jury. Order reversed.—Minneapolis Jour.

The Treatment of Insanity from Traumatism.

Harrison describes four cases of insanity following fractures at the base of the skull, one following a bullet wound of the brain and three from blows on the vertex. Patients should not be considered out of danger because their wounds have healed. They may develop insanity from depression of the skull, bony splinters or thickening or cysts.

Seventy-seven such cases have been recorded in which operation was performed for the resulting insanity, and of these only seven patients had been operated upon immediately after the accident, though no less than forty-eight presented symptoms of depression. It was only necessary to open the dura in four of the seventy-seven cases, showing that the operation is comparatively safe, while the improvement is very marked in many cases. Among the seventy-seven cases are five deaths. As regards their mental condition, fifty-one recovered, twelve were greatly and five slightly improved, and in four there was no improvement.—Liverpool Med.-Surg. Jour., July, 1898.

Extracts and Abstracts.

Researches Concerning Infiltration Anæsthesia.

By Dr. Paul Heinze, Dresden.

Dr. Heinze records the results obtained in an exhaustive series of experiments with the various methods of infiltration anæsthesia. Most of the investigation has been purely clinical, but little of it rests even upon animal experimentation. It is only by trials upon one's own person that the details can be elucidated; and this method was the one the author employed.

The technique was as follows: A very fine hypodermic needle was inserted flat into the cutis of the forearm, and a small amount of the fluid injected. This amount was approximately the same in all cases, being sufficient to raise wheal as large as a bean. The sensations at the moment of injection were noted and the changes of sensibility found by means of a fine needle, and their duration noted. To obtain absolutely like conditions, for comparative purposes only, often repeated directly consecutive experiments were used. The solutions were all at medium room temperature, since experimentation with an indifferent 0.6 per cent salt solution had shown that solutions at a considerably lower or a slightly higher temperature affected sensibility very little if at all. Anæsthesia dependent upon the low temperature of the solution employed rapidly passes off as it gets warm, whilst hot solutions are liable to damage the tissues, and their wheals remain red and painful.

Distilled water was found to be absolutely useless as a local anæsthetic. Solutions of the same sp. g. as the tissue fluids are the only ones which can be employed without disturbing osmotic effects, and are called by De Vries isotonic concentrations. The sp. g. of an isotonic salt solution varies in different animals. In the human subject it should contain 0.9 per cent of sodium chloride. But the experimentation showed that within certain limits, from 0.6 per cent to 2 per cent, the osmotic action was so slight that the injection was entirely painless. And in solutions of such concentrations the salt has no specific poisonous effect.

Salt solutions less than 0.6 per cent cause imbibition and swelling; those of 2.5 per cent and upward dehydration. When the latter are used there is irritation; the center of the wheal sinks in, whilst the wheal itself becomes somewhat larger. This phenomena occurs with any indifferent salt in similar concentration; with other materials the symptoms are naturally masked by the specific action of the drug itself. Hence experimentation with very dilute solutions of special substances can only be properly done with the addition of 0.6 per cent of sodium chloride, which causes a like amount of swelling in all of them.

The author's conclusions differ from those of Schleich in regard to the painlessness and prompt anæsthetic effects of a 0.2 per cent saline solution. Schleich has claimed repeatedly that this fluid causes only a slight tension, and that it is a practical local anæsthetic. Heinze found that a 0.2 per cent solution is very painful, that the anæsthesia is not complete and that it is anything but practical. He also sides with Custer in disputing the correctness of many of Schleich's assertions in regard to the actions of neutral solutions and other fluids.

Sugar solutions Heinze found had no specific effect upon the sensory nerves. Bromide of potassium was an intense irritant and did not even partially fulfil the requirements of a surgical anæsthetic. Pyoctanin (methyl violet) and methyl blue were still more unsuitable, since their actions were necrotic; the wheals always became gangrenous and ulceration resulted. Caffeine and its salts were also found to belong to the class of painful anæsthetics, and their depressant action on the sensibility of the cutaneous nerves were found to be very slight.

Carbolic acid Heinze admits to be efficacious as far as its anæsthetic effect was concerned, but it is practically useless on account of the dangers of gangrene. Even a 2 per cent solution used on the unbroken skin has caused vascular stasis, thrombosis and gangrene, due to the destructive effect upon the white and red globules. When we consider that in major operations the infiltrated tissues must remain for hours in the most intimate contact with the drug, and that these tissues are frequently already diseased, it is not surprising that gangrene should occur.

Heinze then proceeds to cocaine, remarking that the errors in Schleich's other conclusions necessitate a careful repetition of his experiments with this drug. The osmotic tension of cocaine, as of all alkaloids, is a very slight one, and a 3.7 per cent cocaine solution is isotonic with a 0.6 per cent saline solution. A 1 per cent cocaine solution is isotonic with a 0.15 per cent salt solution, and a 0.1 per cent one is not distinguishable in its imbibitory qualities from pure water. The action of solutions like the latter is a mixture of imbibition and cocaine anæsthesia; the menstruum alone will cause a 15 minutes' anæsthesia. The paralyzing effect of the cocaine quickly masks the pain. The author admits that an anæsthetic effect without pain with a 0.02 per cent solution is a "surprising result;" for one can readily convince oneself by trial that such a solu-

tion is very painful, and that a tender, red infiltration is left behind.

The author found that the lower limit of appreciable cocaine effect in an isotonic salt solution was extremely low, down to 0.005 per cent (1:20.000), and that such solutions were equally effective with watery ones; but the isotonic solutions did not injure the tissues, and the resultant wheals rapidly disappeared. Concentrated solutions, 3 per cent and upward, were found to be very painful, as Schleich remarks.

Morphine causes some anæsthesia, according to Heinze's investigations. In the lower concentrations this is partly the effect of the menstruum, as is shown by the very violent pain, which disappears progressively with the higher percentages as the morphine effect gains the upper hand. The use of all the solutions is accompanied by more or less violent paræsthesias. A 0.1 per cent solution acts exactly like distilled water. Morphine is only active as a local anæsthetic in strong solutions and always causes intense irritation. It is decidedly inapplicable for local anæsthesia.

As regards the solutions recommended by Schleich for local anæsthesia. Heinze found that in any surgically useful anæsthesia that its effects depend on the 0.2 per cent of cocaine in solution No. I, and not on the morphine or the sodium chloride; the same is true of solution No. II, containing 0.1 per cent of cocaine. In solution No. III the swelling and the cocaine combined cause a short, complete anæsthesia, obtained at the expense of violent irritation. On the other hand, 0.01 per cent of cocaine alone causes a temporary but painless analgesia.

Heinze therefore considers Schleich's solution No. III as entirely useless, whilst Nos. I and II are efficacious on account of the cocaine that they contain; but the effect is obtained at the expense of a considerable irritant and noxious effect. Schleich's anæsthesia is entirely a cocaine anæsthesia. A 0.8 per cent sodium chloride solution, containing 0.05 per cent to 0.2 per cent of cocaine is the most suitable mixture of the kind for local anæsthesia; any admixture of other substances impairs its value.

Of all the new local anæsthetics eucaine, employed in the form of the hydrochlorate, has excited the most interest. Alpha-eucaine, the salt first prepared, is closely related to cocaine. Its especial advantages over cocaine have been claimed to be that it is less poisonous, that it can be sterilized by boiling, and that it is free from by-effects. Its possession of the first two qualities has been acknowledged by all authorities, as also its effectiveness for the production of complete anæsthesia; but the third one has been disputed, more especially as regards the presence of irritative effects. In ophthalmology, most particularly, this has been noticed.

Heinze has tested it in this respect, and also as regards its value for the purposes of infiltration anæsthesia. He finds that when watery solutions are injected they cause uncomfortable sensations that sometimes amount to pain. These were least marked in 0.5 per cent solutions; above and below that they were more noticeable. Eliminating the irritant action of the water by using in its place the physiological salt solution, he found that all the lesser strengths up to 0.5 per cent were painless. He does not believe that alpha-eucaine can replace cocaine.

Vinci has proposed a modification of the drug which is known as beta-eucaine, occurring also at the hydrochlorate, and soluble up to about 5 per cent in water. He claims that it has the same anæsthetic properties as alpha-eucaine, but has the advantages over it of being less irritating and less toxic. Heinze's experiments showed the complete equality of the beta-eucaine solutions with those of cocaine of equal precentages. This is dependent not only on the similar specific action of the two drugs, but also on the fact, as shown by Dr. Braun's investigations, that the osmotic tensions of cocaine and beta-eucaine solutions are about the same. Even the injection of 1 per cent solutions show signs of swelling, approaching more nearly to those of pure water as the dilution is increased. All solutions of 0.1 per cent and less, like cocaine solutions of equal percentages, cause an anæsthesia lasting about fifteen minutes. A specific irritant effect is caused by beta-eucaine even less than by cocaine; for the injection of more concentrated 5 to 6 per cent solutions were painless, in contrast to cocaine solutions of similar strengths.

In the concluding portion of his article the author calls attention to the tissue changes caused by the infiltration; being of equal moment with the anæsthesia itself. Hence the importance of the employment of solutions isotonic with the tissue fluids. Beta-eucaine and cocaine change the osmotic tension of the fluids that they are dissolved in but little. He recommends the following solution only for the infiltration anæsthesia:

Beta-eucaine	0.1 grm.	(1½ grains)
Sodium chloride.....	0.8 grm.	(12 grains)
Distilled water.....	100.0 grms.	(3½ ozs.)

Such a stable solution, sterilizable by boiling at any time and as often as required, causes no swelling, and therefore does no injury to the tissues; the beta-eucaine itself is the only anæsthetizing factor—Virchow's Archiv, Bd. 153, p. 466.

Notices and Reviews.

"The American Year Book of Medicine and Surgery for 1899." A yearly digest of scientific progress and authoritative opinion in all branches of medicine and surgery, drawn from journals, monographs and text-books of the leading American and foreign authors and investigators; collected and arranged by eminent American specialists and teachers, under the editorial charge of George M. Gould, M. D. In one imperial octavo volume of 1,100 pages, uniform in size with the "American Text-Book" series. Profusely illustrated. Cloth, $6.50 net; half morocco, $7.50 net. Philadelphia: W. B. Saunders; Chicago: W. T. Keener.

One of the perennial pleasures which we have learned to count upon is the receipt of this splendid epitome of the new and progressive medical truths of the year. The present volume, like that of last year, is an improvement on those which have preceded. For as Dr. Gould says in his preface, though each year adds to the enormous difficulty of condensing the results of the advance made in all departments of medical science, within the limits stated, "practice makes perfect," and it is greatly to our advantage that most of the members of the editorial staff continue to serve with that expertness and intelligence in culling, and ripeness of judgment in deciding what is of value, that can only be obtained from experience in such work.

It is obviously impossible to make an exhaustive analysis of the work, but in the interest of those who are not yet subscribers, and as changes have been made from year to year in the editorial staff, it may be well to make a brief reference to each department. In consequence of the death of Dr. William Pepper, the subject of general medicine has been given into the hands of Drs. Alfred Stengel and D. L. Edsall of Philadelphia. Two hundred and thirteen pages are devoted to this department, the greatest amount of space being given to a review of new and important work in typhoid fever, tuberculosis, and the diseases of the stomach. The editors believe that the most substantial advance in medicine in the year just passed is in the department of infectious diseases, and much space is devoted to the laboratory methods of investigation in this class of diseases.

Professors W. W. Keen and J. Chalmers Da Costa review the year's work in general surgery and 246 pages are devoted thereto. They find that the real progress during the year consisted chiefly in the accumulation of statistics and improvement in methods of work, although the performance of gastrectomy by Schlatter and others, and the treatment of pulmonary tuberculosis by producing pneumothorax by injections of nitrogen gas are referred to as striking exceptions. As usual, some little space is devoted to the discussion of asepsis and antisepsis, especially with reference to the hands of the operator. Evidently the editors believe that a thorough method of cleansing the hands will continue in favor and that the use of gloves, especially in operations where the tactile sense is important, will be found desirable. Much space is devoted to anæsthesia, and a critical review of the deaths from anæsthetics during the year. The surgery of the peritoneal cavity has attracted the usual amount of attention and the ideal suture for the intestine has evidently not been found. Much good work has been done since the issue of the Year Book of 1898, in fractures and bone diseases, and the discovery of Röntgen has contributed largely. Practical conclusions from the study of gunshot wounds during our recent expansiveness come too late for consideration in the present volume.

The department of obstetrics is well covered by Drs. Barton Cook Hirst and Newman Dorland. The most important developments during the year have evidently been in the field of fœtal pathology. Gynecology is reviewed by Drs. Baldy and Dorland of Philadelphia, who believe that radicalism has even within the last year very largely given way to a beneficent conservatism. They also note valuable progress in organotherapy. Drs. Louis Starr and Alfred Hand, Jr., have skillfully edited the department of pædiatrics. They note that the chief progress in this department has been in the direction of prevention of disease, and the management of children as individuals, and when grouped together in institutions.

Drs. Guitéras and Riesman have edited the department of pathology, which is most excellently illustrated with lithographs and micro-photographs. Dr. A. Church reviews the work of the year in nervous and mental diseases, and notes progress in both pathology and therapeutics.

The work in orthopædic surgery has been

reviewed by Drs. Virgil P. Gibney and Hilton Waterman of New York.

Forty-five pages are devoted to ophthalmology by Drs. Howard F. Hansell and Wendell Reber of Philadelphia. They call particular attention to the more general recognition of the absolute necessity of good sight in all who participate in the public transportation service, and the prominence now given to refraction as one of the most fruitful branches of preventive medicine. Otology is reviewed by Dr. Charles H. Burnett of Philadelphia; diseases of the nose and larnyx by Drs. Fletcher Ingals and H. G. Ohls of Chicago; Cutaneous diseases and syphilis by Drs. L. A. Duhring and Milton B. Hartzell of Philadelphia; materia medica, experimental therapeutics and pharmacology by Drs. H. A. Griffen and J. H. Tillingast of New York; anatomy by Dr. C. A. Hamman of Cleveland, Ohio; physiology by Dr. G. N. Stewart, also of Cleveland; legal medicine by Dr. Wyatt Johnston of Montreal, Canada; public hygiene and preventive medicine by Dr. S. W. Abbott of Boston; physiologic chemistry by J. J. Abel of Baltimore, Maryland.

A complete and carefully prepared index closes the volume. C. D. W.

"Transactions of the Rhode Island Medical Society. Vol. V., Part IV. Providence, 1898.

This part of the society's transactions contains the proceedings, and the annual address by Dr. F. C. Shattuck of Boston on "Specialism, the Laboratory and Practical Medicine." In addition there are ten other papers by members of the society, necrologies, etc.

Transactions of the Iowa State Medical Society, Vol. XVI. Burlington, Iowa. 1898.

The transactions of the forty-seventh session of this flourishing society of which our associate, Dr. H. L. Getz, was one of the vice-presidents, makes a volume of over 400 pages. It is nicely printed and bound, and in strong contrast in this respect to some of the volumes of former years.

As usual in transactions in similar societies, the papers read covered a variety of subjects. There is besides lists of members, obituaries, etc. In the section of surgery, attention may be called to the papers on Amputations by Dr. A. S. Wright; Fracture Dislocation of the Spine, by Dr. C. L. James, and one on Surgical Treatment of Tubercular Joints by Dr. D. W. Finleyson.

Saunder's Pocket Medical Formulary, with an Appendix, etc. By William M. Powell, M. D. Fifth Edition. Thoroughly Revised. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1899. Price, $1.75 net.

It strikes us that of the many pocket formularies, dose books, etc., on the market this is the most serviceable. In the first place it is very compact, although it contains no less than 1,734 formulæ. It is provided with blank pages so additions may be made as required, and it has a thumb index. The formulæ of course are arranged alphabetically and are followed by tables of doses, incompatibles, weights and measures, eruptive fevers, etc. The appendix contains Mr. E. Hurry Fenwick's "Golden Rules," hypodermic formulæ, poisons and antidotes, diet tables, and a thoroughly up-to-date section on "Drugs and Materials Used in Antiseptic Surgery." The work is bound in wallet form with pocket and pencil, and will prove an indispensable companion.

Three Thousand Questions on Medical Subjects; Arranged for Self-Examination. Second Edition. Enlarged. Philadelphia: P. Blakiston Son & Co. Chicago: E. H. Colegrove. 1899. Price 10 cents.

This is the second edition of this little work which is made up of a series of questions on the primary branches of medicine, and the specialties including dentistry. Every other page is blank for notes; it occupies very small space, will almost fit in the vest pocket. While intended primarily for students, it will be found useful by practitioners who desire to review their stock of knowledge for state board, army and other examinations.

"A Treatise on Fractures and Dislocations."—For Practitioners and Students. By Lewis A. Stimson, B. A., M. D., Professor of Surgery in Cornell University Medical College, New York. In one octavo volume of 823 pages, with 321 engravings and 20 full-page plates. Cloth, $5.00 net. Leather, $6.00 net. Philadelphia and New York: Lea Brothers & Co. Chicago: E. H. Colegrove.

While this work is really a second edition of the one published some years ago, yet owing to the additions and rewriting of large portions of it, it is practically a new work. The part on Fractures is nearly all new. This part contains a good account of fractures of the skull which is omitted from similar works, e. g., Hamilton's, for some reason or other.

The ambulatory treatment of fractures is not spoken of very highly, the author believes that

the ultimate results are "likely to be of some benefit to the patient, although far less than is claimed by some who have sought to generalize the method;" also: "On the other hand the method exposes to risks of displacement, and of healing with deformity which in my judgment outweigh even the claimed advantages, and the statistics show that the risk is a real one and that the damage results in a considerable proportion of cases."

As regards operative measures in fractures of the vertebræ, the author is very conservative and thinks it is too early to formulate any rule of practice. Dr. Stimson believes that the operation can do good in only a small proportion of cases; on the other hand he believes that the operation is not likely to do harm, and that it occasionally discloses some condition which could not be otherwise recognized and corrected. His own preference is strongly for reliance upon traction and the plaster-cast.

The part on Dislocations has been largely rewritten also, and has a good feature in that the anatomy of the joints under discussion is treated fully before the dislocations are described.

The illustrations, over 300 in number, are largely original, and we are glad to miss many of the familiar ones which have been copied from text book to text book since the days of Sir Astley Cooper and Malgaigne. Besides the text illustrations there are 20 full-page X-ray pictures in color; concerning these Dr. Stimson makes the following judicious remarks:

"While the X-rays have been of interest and value in showing details of certain fractures, especially at the wrist, elbow and ankle, yet it cannot be fairly said that they have yielded much information of practical value, which could not have been ascertained by palpation. Probably their usefulness will be increased by improvement in methods and apparatus, but at present the information which they give needs to be sifted with great care from among many misleading appearances."

The print, as usual in publications from this work, is fine and clear and the work may be confidently recommended to anyone wishing a complete exposition of the important subjects on which it treats.

"The Phonendoscope and Its Practical Application." By Prof. Aurelio Bianchi. 77 pages. 37 illustrations. Price, 50 cents. Philadelphia: George P. Pilling & Son.

At the International Medical Congress in Rome, 1894, Bianchi and Bazzi introduced the instrument called by them the "Phonendoscope." In order to advance its claims and to show Americans where the genuine instrument can be obtained, the manufacturers have had translated a few lectures delivered by Prof. Bianchi.

The translator, Dr. A. George Baker, has opened the way for criticism of his work by calling attention in the preface to the fact that continental professors have a way of writing in the "University Tongue," "they frame their sentences in a peculiar way and with many circumlocutions." "The ordinary reader is sure to forget the subject with which the sentence started by the time he gets to the end of it. We Americans do not express our thoughts after this fashion. Our sentences are short and plain," etc. He tells us he has aimed to avoid the involved structure of the "University Tongue" and has tried "to remain true to 'Uncle Sam's' pure American way of expressing himself."

We therefore view with surprise and perplexity the grammatical, not to say the rhetorical, structure of some of his sentences. From among several examples we quote the following: "And thus it came to pass that my idea was put into practice and a method of auscultation and percussion, the slightest effect of which is united with the greatest simplicity, and by means of the intelligence and patient labors of the thorough physicist, was fully realized, (p. 11). Again, "By means of the small buttoned rod which, when needed, may be secured to the lower vibrating plate, makes it possible to localize the point to be examined by auscultation, i. e., the point to be examined, with the instrument, by the ear (p. 11)." We really believe Bianchi wrote better Italian than the translator English.

The lectures are given largely to declaration of fact rather than the proof of the same, —which, from the nature of the subject, must be in a large measure the case,—and there is a great deal of repetition. Yet in spite of this drawback, one can find excellent directions as to the details of phonendoscopy and a clear statement of the advantages claimed for the phonendoscope over the steth-

oscope. These are that one can hear more distinctly the sounds made by normal or diseased organs in the performance of function, and that sounds artificially produced by percussion or by rubbing the skin with the finger can be more accurately analyzed and the size and contour of underlying organs better mapped out. Under the first head Bianchi claims to be able to study not alone the sounds of the heart, lungs intestines and stomach, but also those of joints, muscles, the eye, etc. Under the second head, while admitting that auscultatory percussion can be, and has been practiced with the ordinary stethoscope (Laennec, Piorry, Camman, Clarke and others) Bianchi believes that by the aid of the phonendoscope he can map out accurately the various organs of the body, and gives figures to show that such details as the lobes of the lungs, the lobes of the liver, the borders of the empty and the full stomach, and even the chambers of the heart can be determined. Such statements as this that the auricles and ventricles can be outlined will excite wonder if not credulity in the reader, but should also incite one to a more careful trial of this instrument with a carrying-out of the explicit directions for use given by its inventor. If what he claims is true, the phonendoscope deserves a much more important place among the instruments of precision employed by the diagnostician.

A brief chapter by Ragnault on the Phonendoscope and the Digestion of Fluids and one by Anastasiades on the Application of the Phonendoscope in the course of Pregnancy complete the book.

In spite of the advertising air of the work it is really valuable.

JAMES B. HERRICK.

PAMPHLETS RECEIVED.

"The Radical Cure of Hernia by Fowler's Method, with Reports of Cases," by H. O. Walker, M. D., of Detroit, Mich.

"Some Remarks About the Study of Medicine in Germany—Diseases of the Ear as a Specialty," by Emil Amberg, M. D., of Detroit, Mich.

"Antinosine in the Treatment of Diseases of the Eye and Ear," by W. Franklin Coleman, M. D., of Chicago.

"Diarrhœa and Bacteria—Caries of the Teeth and Diseases of the Stomach—The Early Diagnosis of Cancer of the Stomach," by Charles D. Aaron, M. D., of Detroit, Mich.

"The Caustic Action of Arsenic in Treating Carcinomatous Growths Accessible from the Surface of the Body," by C. W. Simmons, M. D., of Philadelphia.

"Malpractice," by G. W. Thompson, M. D., Winamac, Ind.

"Some Sources of Failure in Treating Lachrymal Obstruction," by Leartus Connor, A. M., M. D., of Detroit, Mich.

"On the Treatment of Deficient Excretion from Kidneys Not Organically Diseased—Hereditary Syphilis," by L. Duncan Bulkley, A. M., M. D.

"The Treatment of Heart Disease by Saline Baths and Resisted Movements—Schott Method," by Charles Lyman Greene, M. D., of St. Paul, Minn.

"A Case of Landry's Paralysis, etc.," by Charles Lyman Greene, M. D., L. B. Wilson, M. D., and J. L. Rothrock, M. D.

"A Case of Concentric Displacement of the Heart to the Right, Presenting Some Unusual Features," by Charles Lyman Greene, M. D., and J. L. Rothrock, M. D.

"Inspection of Summer Resorts," by Granville P. Conn, M. D., of Concord, N. H.

"Echinococcus of the Lungs—The Technique of Closing Cæcal Fistula—Is Appendicitis a Surgical Disease?" by Carl Beck, M. D., of New York City.

Railway Miscellany.

Give Credit Where Credit Is Due.

The accompanying communication expresses so earnest a conviction of the work done by railroads in a direction in which, so far as we know, they have not often been credited with influence, that we give space to it—the more gladly, as it comes from a representative of a class of employes among whom the influence would naturally be most strongly felt:

Chicago, Jan. 26, 1899.

To the Editors:—Of the many agencies at work in the interest of temperance, none have accomplished more real good than the railroad companies; the benefits resulting from their efforts in this direction have, indeed, become widespread. The enforcement of strict rules forbidding employes using intoxicating liquor on or off duty has been the means of bringing back into a life of usefulness many good but weak men, who were victims of a cursed social custom, the direct cause of more misery and poverty in the homes of this hard-working class than all the forms of disease, casualties and acci-

dents to which this hazardous occupation is heir. To this custom the railroad companies have dealt a deathblow, by declaring that men who use intoxicants cannot secure employment. For a time this movement of the companies was looked upon as unusually harsh, especially by the moderate drinkers, who could see no harm in an occasional glass. However, this feeling gave way as the application of the rule became fruitful of good in many ways, and is now accepted as a kindly interference in behalf of all employes and their families.

Sobriety, with its glorious surroundings, has in thousands of cases taken happy possession of miserable drunkeness, the bright smile of contentment charms many a fireside once the home of pain and sorrow. We cannot speak in terms of scanty praise of this work, while viewing the happy transformation wrought by this proclamation, reversing the downward course of many well meaning and industrious men.

The blessings of the faithful wife and mother join with the prayers of their happy children in praise for this deliverance from the curse of whisky.

F. J. O'ROURKE, Switchman.

Relief Departments and Employers' Liability.

St. Louis, Mo., Dec. 10, 1898.

To the Editors:

I am told that recent laws of parliament in England have made it illegal for a railway company over there to have a relief department on its line by which employes release the company from liability for damages in consideration of getting the benefit of such department. I am told such agreements are now illegal in England. Can you tell me what this law is?

ROUNDHOUSE.

[The nearest approach to such a law is a bill now before parliament, the text of which is as follows:

"A Bill to Amend the Truck Acts, and to make it illegal for employers to compel their workmen, as a condition of employment, to become or remain members of, or to leave, any benefit or friendly society or club."

"Be it enacted by the queen's most excellent majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in this present parliament assembled, and by the authority of the same, as follows:

"An employer shall not make any contract with a workman whereby, as a condition, express or implied, of entering into or remaining in the employment of the employer, the workman shall be required to join or to contribute or subscribe to, or to leave or cease to contribute or subscribe to, or to bind himself not to join or contribute or subscribe to, any benefit or friendly society, scheme or club, or to make any payment by way of insurance against, or as a provision in the case of, accident, sickness, infirmity, old age or death, and any such contract shall be illegal, null and void.

"An employer shall not make any deduction from the wages of a workman, or be entitled to any set-off or counter-claim in any proceedings for the recovery of a workman's wages, in respect of any contribution, subscription or payment which the workman may have agreed or been required to make or pay under any contract made illegal by this act, and any workman may recover from the employer any sum deducted or paid under any such contract.

"If any employer enters into any contract contrary to this act, or makes any deduction contrary to this act, he shall be guilty of an offense against the truck act, 1831, and shall be liable to the penalties imposed by section 9 of that act, as if the offense were an offense in that section mentioned."

"This act shall come into operation on the first day of January, one thousand eight hundred and ninety-nine."

This bill, it will be seen, only forbids employers to make the joining of a relief department compulsory on their employes as a condition of employment. The principle of the voluntary relief department or "friendly society" is very deeply rooted on English railways. Almost all employes are members of such a society, and the courts uphold contracts based on them.—Eds.]

The Northern Pacific Beneficial Association.

The report of this association, of which J. W. Kendrick, general manager of the N. P. R. R., is ex-officio president of the board of managers, and M. C. Kimberly, general superintendent of the N. P. R. R., is president, for the year ending June 30, 1898, is at hand. The report shows much betterment at both the Brainard and Missoula hospitals, and while the work of the association has been thoroughly cared for, yet a surplus of $9,000 is carried forward to the next year. Surgeon Walter Courtney, at Brainard, and J. J. Buckley, at Missoula, in their report of cases, while showing a large amount of major and minor surgery, demonstrate a degree of conservatism highly complimentary to them. The general flattering condition of the association and the hold which it has upon its membership at the present time, is complimentary to Mr. W. A. Laidlaw, secretary of the association, who administers a greater portion of the work of the organization, and which is quite in contrast to the state of affairs which existed while under

the administration of his predecessor, the late Mr. H. W. Knauff.—M. Sentinel.

Bicycles as Baggage.

There has been a test case in the English courts on a question which is agitating cyclists all around the world, more or less. It was brought in the Queen's Bench division, against the Great Northern Railway company "on behalf of one Britten," seeking "to recover sixpence paid for the conveyance of a bicycle from King's Cross to East Finchley." And after hearing and argument the court decided that the plaintiff could not recover, for the reason that "a bicycle cannot be ordinary luggage within the definition."

The special interest attaching to this case is found in the fact that the attorney for the plaintiff made his argument on the very lines on which similar claims are based in this country. He claimed that a bicycle came clearly within the definition of "personal luggage," for the reason that it was carried by the traveler for his own personal convenience and use in connection with his journey, and was an article such as was ordinarily carried for that purpose. But his lordship, in rendering his decision, brushed away all such considerations by declaring that "the idea of luggage" must control; and as luggage implies something that is "packed," not taken "loose, like a bicycle," the wheelman lost his case.—Boston Post.

Railway and Other Material in Russia.

United States Consul-General W. R. Holloway, at St. Petersburg, is of the opinion that Russia constitutes a world large enough to command more attention from the leading manufacturers and exporters of the United States who are seeking a market for their surplus. The consul says, in a recent report, that there is a general desire on the part of the Russian merchants and dealers to make connections with American manufacturers, provided this can be done advantageously. The Russians, as a rule, it is stated, object to dealing with a subagent, appointed by a general agent of an American house in England or Germany, and much prefer to deal directly with the home firm. Also, they object to circulars and catalogues printed in English, which comparatively few of the business men can read.

The consul assures us, however, that the Russians "have respect and admiration for the inventive genius of the Americans, and, while conservative, they are always willing and anxious to look into new inventions from the United States," and that notwithstanding the rapid progress Russia is making in the establishment of manufactories, which are being encouraged by the government, she is not able to keep pace with the increased demand for iron, locomotives, cars, coast steamers, battleships, elevators, electrical apparatus and supplies, coal handling and other machinery, as well as in other lines in which our supremacy is unquestioned. He adds that as Russia offers such a rich field for investment and profitable trade, our manufacturers should study the market and methods of doing business. The Russian railways and manufacturing systems are now in their infancy, and there will be for years a constant demand for car material, railroad machinery, etc.

A Formula for Rating Engines.

Chicago Great Western Railway,
St. Paul, Minn., Jan. 14, 1899.

To the Editors:

Referring to your letter, in which you ask about matters of interest during the past year. This is a question which can only be answered in a very limited way. I may say that one of the most interesting occupations of 1898 has been in the effort to keep (comparatively) old motive power going on the basis of a tonnage rating which is intended to bring the loading up to the very limit of the capacity of the engines and in continuous runs, in freight service of nearer 200 miles than 100 and in passenger service of from 250 to over 400. It is necessary to turn almost every engine as soon as possible after arrival at a terminal and all freight engines are pooled. In this connection it may be of interest for me to say that, as a result of a great many tests, I have been using for some time the following approximate formula for determining the hauling capacity of locomotives in freight service upon sustained grades:

$$\text{Haulage capacity} = T \times \frac{.865}{6+20G} - W.$$

T=traction upon basis of M. E. P.=.90 boiler pressure.
G=grade, per cent.
W=weight of engine, tender and caboose.

This is approximate, in that it takes no account of the curves and is really intended to represent what can be done under average local conditions. It seems to be quite often assumed that all of the tractive power as calculated is effective at the drawbar, and otherwise the loss is variously stated as from 7 to 50 per cent. I have put it at 13½.

I have rated engines on this basis, using a traction equal to as much as 30 per cent of the weight on the drivers, and have reached the conclusion that while such a performance can be obtained under favorable circumstances,

a rating based on developing a traction of more than 26 per cent of the weight on drivers is not practicable, at least in a northern country. T. L.

Another of the Oldest Railway Men.

Jacksonville, Ill.

To the Editors:—We often hear something about "the oldest railroad man." I think I have found him right here in Jacksonville. Mr. James Ransom, past 86 years of age, residing in this city, is one of the best-preserved men of his age I ever knew. He was born near Manchester, England, and came to this country about fifty years ago. He informs me that when a young man, while serving his time at the trade of carpenter, he worked on the Manchester & Liverpool Railway, which was opened, I think, in 1830, and was the second railway in the world, the Stockton & Darlington being the first. His "boss" had a contract on the road. I wonder if there is another man living who helped to build that road?

Truly yours, C. M. MORSE.

Mr. Morse is himself one of the oldest railway officials in this country, in point of service. He was for many years with the Chicago & Alton as division superintendent and division freight agent, and is still on the rolls, although he was relieved from active service about five years ago, on account of partial loss of eyesight. Many friends will be glad to see his familiar name again in these columns.—Eds.

The bill which has been introduced in congress for the protection of railway employes provides as follows: "That every common carrier engaged in interstate commerce by railway shall be liable for all damages sustained by any person, including employes of such common carrier, in consequence of the neglect of the agents, or by the mismanagement of the engineers or other employes of such common carrier, and in consequence of the willful wrongs, whether of commission or omission, of such agents, engineers or other employes, when such wrongs are in any manner connected with the use and operation of any railway on or about which they shall be employed; and no contract which restricts such liability shall be legal or binding. Nor shall any contract of insurance, relief, benefit or indemnity, in case of injury or death, entered into prior to the injury, or the acceptance after the injury of any such insurance, relief, benefit or indemnity by the person injured, his widow, heirs or legal respresentatives, constitute any bar or defense to any cause of action arising under the provisions of this statute: Provided, however, that when any state or territory has legislated, or may hereafter legislate, upon the subject of the liability of masters for injuries inflicted upon one co-employe by the negligence of another, the laws of the state or territory wherein the court is held shall be the rule of decision in all cases brought to recover for such injuries."

The annual report of the interstate commerce commission indicates satisfactory progress in the matter of equipment with automatic couplers and air brakes. Returns covering the six months ending June 1, 1898, received from 283 of the 294 carriers which were granted an extension of time, show 1,156,616 freight cars owned, an increase of 20,611 over the number reported on December 1, 1897. During the six months, 119,938 freight cars were equipped with automatic couplers and 67,400 were fitted with train brakes, making a total of 795,253, or 69 per cent, having automatic couplers, and 511,666, or 44 per cent, equipped with train brakes, up to June 1, 1898. On that date 29,175, or 90 per cent of the total number of locomotives owned by these reporting carriers, were equipped with driving-wheel brakes. In 1897 there were 1,693 men killed and 27,667 injured from all causes in railway service. In coupling and uncoupling cars alone 219 less men were killed and 4,994 less were injured in 1897 than in 1893. The number of such employes killed has been reduced one-half, and the number of injured also practically reduced one-half.

The annual report of the Nebraska state board of transportation, which has just been issued, contains an interesting chapter on the subject of giving and accepting railroad passes. A list of state officials who hold passes is given, and includes every officeholder and prominent politician in the state. The reasons for giving passes are thus interpreted by the board: "Some passes are granted for the same reason that an unarmed citizen surrenders his purse in the night—for peace and safety. There are highwaymen who hold up corporations, candidates for office and evil-doers, who pay to avoid exposure. Such men sometimes become members of legislatures. Passes are granted these men, not for the good they do, but to keep them from doing harm." The passage of a law prohibiting railroads from giving passes to state officials and the latter from accepting passes is recommended.

Two bills have been introduced in the lower branch of the North Carolina legislature requiring railroads to operate separate coaches for white and colored passengers. One of the bills is an exact copy of the law now in force in Tennessee, and which has been declared constitutional. The other is similar to it except that it provides "that any first-class coach may be divided into compartments, separated by a substantial partition, in lieu of separate coaches."

THE Railway Surgeon

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TRAUMATISM OF THE EYEBALL INVOLVING THE CRYSTALLINE LENS.*

BY CASSIUS D. WESCOTT, M. D.,
Instructor in Ophthalmology at Rush Medical College, Ophthalmologist to the Chicago, Milwaukee & St. Paul Ry. Etc., Chicago.

One of the most fascinating subjects in ophthalmology is that of traumatism of the eyeball, but it is a very broad subject and I shall confine my remarks to the penetrating injuries involving the crystalline lens, and recite illustrative cases. As you are all aware, the crystalline lens is a biconvex, solid body, contained in a tense, elastic, structureless capsule and supported in its position behind the iris by the suspensory ligament It is an epithelial structure composed of many layers of transparent, prismatic fibres, closely applied to each other, and held together by an equally transparent cement substance.

Cataract is defined as a "diminished transparency or an opacity of the crystalline lens or its capsule" (Gould). As we usually see it in old people it is dependent upon local pathological states involving the nutrition of the eye. The etiology is by no means always clear, and often several factors are necessary to explain it. It doubtless often results from general nutritive changes such as accompany goutiness, chronic rheumatism and kidney disease. Traumatic cataract may be produced by direct injury of the lens, or indirectly, as by concussion, lightning stroke, etc. I have no experience with traumatic cataract produced by indirect violence, and shall therefore confine my remarks to cases produced by direct injury of the crystalline lens.

When the capsule of the normal lens is pricked or torn by accident or design, the aqueous humor comes in contact with the lens substance. The transparent fibres swell and become opaque, and within a few hours after such an injury the lens appears to be cloudy in the region of the traumatism, and if we examine carefully with oblique illumination we can usually see opaque fibres protruding from the rent in the capsule, especially if it is large, and frequently small masses of lens debris will be found in the anterior chamber. If the rent in the capsule is small it may close in a short time, and only a small portion of the lens substance become opaque. If, however, the injury to the capsule is large and the patient young, the entire lens may become opaque, usually with considerable swelling, masses of the lens substance will continue to fall into the anterior chamber, until finally after days or weeks almost the entire contents of the lens capsule is dissolved by the aqueous humor and passes into the circlation. In a patient of forty years or more, in which the lens contains a more or less firm nucleus, if the injury to the capsule is not large, only the cortical portion may undergo solution, the opaque nucleus remaining.

The treatment of recent cases of traumatic cataract naturally depends upon the behavior of the eye. If reaction is prompt and severe, and the tension of the eyeball becomes high in consequence of the swelling of the lens, it is our duty to evacuate as much of the lens substance as possible, either through the original wound, or a new one made in the substance of the cornea. If little reaction follows one of these injuries, and the tension of the eye remains normal, or nearly so, we may safely bide our time, and frequently if we maintain an aseptic condition of the eye, and keep the iris under the influence of atropin, the eye will quiet down in a few days, and in young persons the pupil will sometimes become clear without further

* Read at the sixth annual convention, C. M. & St. P. Ry. Surgeons, Chicago, November, 1898.

treatment. If, however, the cataract is not spontaneously absorbed we may imitate nature's method by performing the operation known as discission, or needling. This is done by passing a properly shaped needle into the eye and opening the anterior capsule of the lens, and sometimes stirring up, more or less, its substance. The effect is to bring the aqueous again in contact with the opaque fibres, and to cause their further solution. Sometimes the operation must be repeated several times in order to obtain a clear pupil.

It may be interesting to review in this connection a few cases which have occurred in my private practice.

Case I. Leslie McG., aged 7, was referred to me June 30th, 1896, by Dr. J. L. Taylor, of Libertyville, Ill. The boy's right eye had been struck by a sharp stick four days before. He was complaining of no pain, but the eye was blind and sensitive to light. Upon inspection it presented a ragged wound of the cornea immediately over the pupil, which was practically continuous, with a similar rent in the capsule of the lens. The lens was apparently entirely opaque and lens substance was escaping from the capsular opening, and dropping into the anterior chamber. As the eyeball was soft and I feared stirring up infection, I simply cleansed the face and lids very thoroughly with a warm solution of borax, flushed out the conjunctival sac with a warm saturated solution of boric acid, instilled a few drops of one per cent. solution of atropin, and applied a bandage. The dressing I use in practically all cases consists of two or three layers of borated gauze, applied moist, and sufficient cotton to fill the inequalities of the orbit and a bandage of white mosquito netting applied wet. Such a dressing is light and cool, and the bandage contains enough starch to make a fixed dressing when dry, which does not slide or slip. This patient was seen occasionally for a month. The eye remained quiet and the wound in the cornea healed kindly. The iris was adherent to both the cornea and lens capsule when I first saw the case, and I was unable to break up the adhesions with atropin. The lens continued to be absorbed and now there is no cataract save of the capsule, which is partly opaque at the site of the injury. The atropin and bandage were used for only about ten days. A slight needling operation would clear the pupil, and a proper glass would give the boy useful vision in this eye should he lose the other.

Case II. Oscar R., aged 19, was referred to me July 6th, 1897, by Dr. Bertha Bush of Rogers Park, Ill. On the day previous to my seeing him, while celebrating independence day with a small cannon with a large touch hole, the cannon was discharged while he was leaning over it, and his face and eyes were filled with hot powder grains. I found the lids of both eyes œdematous, and speckled with burnt powder. The conjunctiva was also swollen and contained numerous large and small grains of the explosive. The corneæ were riddled with holes and contained many small grains. The pupils were contracted, both lenses were opaque and the iris was prolapsed in both eyes. Both eyes were totally blind. Asepsis had been maintained by a competent nurse, and I ordered atropin and iced compresses for relief of pain. After twenty-four hours the cold applications were discontinued and hot fomentations ordered to be used for fifteen minutes every three hours if the eyes were painful. Three days after the injury a number of powder grains were removed from each eye. On the eighth and sixteenth days more powder was removed, as it gradually worked to the surface of each cornea. The pupils dilated moderately under the continuous use of atropin and the tension was at no time sufficiently great to justify operative interference. By almost constant care, night and day, infection of the wounds was prevented, and three months after the injury there was considerable clear cornea in both eyes. The lens in the right eye had been completely absorbed and the pupil was closed. In the left eye very little absorption had taken place and the traumatic cataract was visible through a moderately dilated pupil. At that time I needled the lens in the left eye in the usual way and lacerated the capsule and opened the pupil moderately in the right eye by the use of two needles. During the next two months the needling operation was repeated twice in the left eye and the patient began to see. Five months after the injury I performed iridectomy in the right eye and a month later needled the capsule in both eyes and ordered glasses. The patient now has

one-half of normal vision in both eyes for distance, and is able to read the finest type.

Case III. Edwin H., aged 10, was referred July 20th, 1897, by Dr. James Gill of Chicago. Three hours previous to my seeing the boy the blade of a dull and soiled pocket knife had been accidentally thrust into the eye by a playmate. I found a wound of the cornea and lens as shown in the specimen which I present. The anterior chamber was empty and the lens was already becoming opaque and discharging soft lens matter through the pupil. The eye was soft and sightless. I was able to secure a moderate dilatation with atropin which enabled me to bring out a hæmorrhage into the vitreous and confirmed my fear that the ciliary body had been injured. There were sufficient data at hand, after my examination, to justify my prognosis, that in all human probability the eye would soon become the seat of an infectious inflammation of the iris and ciliary body, and that enucleation would be required. In spite of iced compresses and atropin, and later hot fomentations, with calomel internally and constant rest in bed, the eye became inflamed and I removed it seven days after the injury. The specimen is of interest chiefly in showing the rapid absorption of the lens substance in so short a time, due, of course, to the large wound of the capsule, and probably also to the fact that the more or less ragged wound of the cornea was not firmly closed for two or three days, and permitted a certain amount of leakage from the aqueous chamber, causing a rapid renewal of the aqueous humor. It may be asked why I did not follow my own teaching in this case and immediately evacuate as much as possible of the lens substance. My answer is that I knew that the wound was infected and that it involved the ciliary body, and we all know the danger from trauma to this portion of the eye, even when made with sterile instruments under aseptic precautions.

Case IV. J. F. E., aged 47, was referred to me October 27th, 1897. He reported that while using a hammer and cold-chisel on the previous day, a small piece of steel had struck his right eye, immediately affecting his sight. I found a ragged wound 2 mm. long in the temporal half of the cornea, a similar wound in the iris and a shallow anterior chamber; the lens was hazy. The patient was complaining of constant aching pain, and the eye was softer than normal. As I had been called late in the evening I applied atropin and a bandage. On the following morning I found the patient free from pain, the pupil moderately dilated and the iris adherent to the capsule, immediately about the wound, and somewhat swollen. The lens seemed to be still more hazy. Of course the eye was blind, and the chances were very good for sympathetic inflammation if the eyeball was not removed, for it was impossible to see the foreign body and obviously impossible to remove it unless it should happen to be embedded in the crystalline lens. As the patient was comparatively well to do and willing to be guided by my advice and to place himself absolutely under my control, I decided to remove the lens in the hope of finding the foreign body and removing with it any infectious material which might have been carried into the eyeball. I immediately proceeded to the operation, first removing that portion of the iris which had been penetrated by the piece of steel. The large nucleus of the lens followed easily after freely lacerating the capsule, but instead of finding the foreign body I found simply the track which it had made in passing through the lens into the back part of the eyeball. The wound healed kindly without undue reaction, and I discarded the bandage on the fifth day. One month later I needled the secondary cataract which had formed, and in another month needled again, securing a clear pupil and giving my patient two-fifths of normal vision with a correcting lens. I have never been able to locate the foreign body within the eye, but it has continued to give no trouble and the eye would be a useful organ of vision should the patient lose the fellow eye.

Of course I cannot advise you to assume the entire responsibility in one of these cases if it is possible for you to share it with the ophthalmologist, but it is often fully as important to be able to make a diagnosis and to know what should be done, as to be able to do the thing indicated. It is obvious from what I have said that when the crystalline lens is injured the eye will become blind from development of cataract, and if the foreign body which pierces the lens is an infected one the eye will be almost certainly lost by inflammation unless the foreign body and the infectious ma-

terial can be removed. It is also true that small foreign bodies, if not infected, are sometimes tolerated in the eye and give rise to no symptoms of inflammation or sympathetic trouble. This is especially true of minute pieces of steel embedded in the lens; but pieces of copper are particularly prone to excite inflammation and suppuration because of their chemical properties. A foreign body of any kind, even if sterile, which lodges in the ciliary body may be counted upon to destroy the eye and to excite sympathetic or migratory ophthalmitis in the sound eye if the injured one is not enucleated.

The first indication for treatment in these cases, as in other injuries of the eye, is to maintain rest and cleanliness, and to remove the foreign body, if possible, when one is present. Many patients so affected are better off in bed in a moderately lighted and quiet room, but in any event the use of the sound eye should be absolutely prohibited. The lids of the injured one should thoroughly washed at least once a day with soap and warm water, or with a warm solution of borax, and cleanliness of the conjunctival sac maintained by carefully flushing it at least once a day with a warm solution of boric acid. The experiments of Randolph and others have proven that solutions of the bichloride of mercury and other antiseptics which can be safely used upon the surface of the eyeball are not germicidal. I have therefore discarded all such and am content with a warm saturated solution of boric acid with which I can at least mechanically cleanse the eye with safety. If there is pain or hæmorrhage during the first twenty-four hours after a penetrating injury of the eyeball, iced compresses are indicated. They may be applied continuously during the first day, but it is not wise to use them longer. Atropin is indicated in all such injuries, except when the tension of the injured eyeball is greater than that of its fellow. Atropin not only produces physiological rest, but dilates the pupil and relieves pain. It is especially important for the future usefulness of the eye that we secure at as early a moment as possible a large round pupil; and if we see the case before adhesions have formed between the iris and the lens capsule or the cornea this is usually not difficult, and a one per cent solution of the sulphate of atrophia is generally sufficient. If there is pain in the eye after the first twenty-four hours hot applications are indicated. They should be used for fifteen or twenty minutes and repeated every three hours. If the pain is due to abnormal hardness of the globe operative interference is called for. If there is no pain and no increase of tension the eye should be cleansed once in twenty-four hours, a drop of atropin instilled and a light dressing and bandage applied. In the good cases such treatment will usually be indicated until all redness has disappeared, when the bandage may be discarded and the eyes protected for a time by colored glasses.

If one of these eyes of which we are speaking becomes suddenly very hard and very painful, and no ophthamologist is at hand and cannot be reached quickly, the surgeon is justified in performing paracentesis of the cornea.

This can be done with any small, thin knife that is sharp and clean, or even with the needle from one's hypodermic syringe, properly prepared. The complete evacuation of the aqueous humor in this way may be sufficient to tide over the critical period and save an eye which would otherwise be lost. But if a freer incision should be made and as much as possible of the lens substance evacuated it would in the majority of cases be much better. If a foreign body which has pierced the lens can be seen we should endeavor to remove it either through the original wound, which may have to be enlarged, or another wound more conveniently placed. If the mote can be grasped with a pair of forceps that would be the best instrument. Pieces of steel or iron which are too deeply embedded in the lens substance to be safely extracted with the forceps can frequently be removed by means of the magnet. If, as in Case IV which I have reported, we have reason to believe that the foreign body is contained within the opaque lens of a patient past middle life, we are justified in attempting its removal by the extraction of the lens without previous attempts at its removal by means of the magnet or otherwise. I did not use the magnet in my case for the reason that it would have been necessary to enlarge the corneal wound in order to successfully apply the magnet point, and extraction of the lens must be performed sometime if the eye was to be of use. I therefore proceeded im-

mediately, with as little traumatism as possible, to extract the lens, hoping to secure the foreign body at the same time.

I am often asked my opinion in regard to operation for traumatic cataract which has become stationary, when the patient has one good eye. I believe that every cataract should be operated upon as soon as the best results can be secured, even if the eye cannot be used with its fellow, in the ordinary ecceptance of the term, for an eye without a lens, if the pupil is clear and the retina normal, increases one's field of vision, and if the sound eye be lost or disabled the patient could be given useful vision at once by means of strong lenses.

DISCUSSION.

Dr. A. I. Bouffleur: I desire to call the attention of the members present to the fact that railroad employes are beginning to appreciate injuries to the eye and their proper treatment more than they did a few years ago; and inasmuch as the number of claims that are being made on account of injury to the eye has been greatly increased in the last year or two, it behooves us to know as much as we can about such injuries. I do not know how it is with all of you, but I always like to hear one or more papers on traumatic conditions of the eye, and I generally request one or more oculists to furnish us papers each year, or give us a report of cases. Dr. Wescott has been kind enough to read a paper at this meeting and to exhibit some interesting specimens. I trust that from his description of eye injuries and his emphasis of the great importance of mechanical disinfection of the eye with the application of a mild antiseptic agent, like boric acid, we will derive a great deal of personal benefit.

Dr. Wescott (closing): I have nothing to add, but would emphasize the importance of even trifling injuries to the eye. I recall one case referred to me by Dr. Bouffleur. A railroad man got a hot cinder in the eye and did not seek advice for a number of days. When I saw him such a deep-seated inflammation had occurred that the entire cornea became opaque and the usefulness of the eye was destroyed. No time is to be lost if we would secure best results in diseases or injuries of the eye.

Another point which I would emphasize is the use of atropine in all penetrative injuries of the eyeball. Atropine puts the eye at rest, relieves pain and prevents the closure of the pupil in an injured eye, if used early. We need not fear glaucoma in these cases if we will watch the tension of the eyeball and discontinue the use of the drug when the indications have been fulfilled.

FIRST AID TO THE INJURED—CONTROL OF HÆMORRHAGE WITH REPORT OF CASES.*

By John A. Thornton, M. D., Lansing, Iowa.

In rendering first aid to the injured, hæmorrhage most frequently demands immediate attention. It may be moderate in degree or dangerous in all railway injuries, and slight injuries may be followed by severe hæmorrhage as well as the graver forms. What I wish to call attention to is the method of controlling and preventing hæmorrhage, which, if not promptly controlled, may cause death of the injured person, or death of the part will cause delay in the healing of the wound or other reparative process.

A large percentage of railway injuries affect the extremities, such as the hand, foot, etc. The nearer the trunk and the nearer the character of the wound approaches the punctured, lacerated or incised varieties, the greater is the danger from hæmorrhage. When distal and crushed or contused in character the immediate danger is less, but remote danger to the integrity of the parts is greater.

Compression, ligation, torsion and the actual cautery are most important; heat, cold, astringent and other styptics will not be considered. Compression, in my opinion, interests us most, and physician and laymen, employer and employed are equally interested. Why? Because employes work side by side, and if one is injured he depends upon another to render first aid. Compression suggests itself as the first remedy for the control of hæmorrhage and is adopted in nearly every case.

When properly used compression, either in the hands of the surgeon or layman, is a factor for good, especially so when prompt

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action is required. Improperly used or in the hands of novices it may become as potent a factor for harm. I wish to call attention to compression of any part of the body in such a way as to cut off the entire blood supply for over an hour. This is attended with great danger and likely to be followed by delayed healing, disintegration or possibly local death, and I can best describe the dangers of improper compression by citing a few cases.

Case I. A brakeman, aged 28, while switching in yards about 3 p. m. caught his foot in a frog, and before he could release it the wheels of engine and tender passed over it, producing a severe crush. The hæmorrhage was profuse and some of the bystanders applied cloth compresses bound down with twine, when it ceased. The surgeon arrived about 5 p. m, removed compresses and applied rubber tubing some three inches above ankle. The patient was then taken to surgeon's home (20 miles) arriving there at 8 in the evening.

I was called to see the patient and found the foot below the tubing cold, covered with clotted blood and very filthy. It seemed impossible to make a careful examination without anæsthesia. The doctor in charge wanted to give the anæsthetic, then examine the wound and allow the patient to come out from the anæsthetic and decide what operation he would have performed. I objected and secured the patient's consent to do such operation as we deemed necessary while he was under the anæsthetic. Examination revealed a laceration on the inner, outer and anterior aspects the foot, and in the median line of plantar surface extending from heel to toe the finger could be passed into the ankle-joint, all the small bones being crushed. I advised amputation at a point high enough to get flaps from the tissues above the point of constriction with the tubing. The doctor scouted the idea of sacrificing so much of the leg, and after giving me a lecture on conservative surgery, proposed disarticulation at the ankle. To this I objected and asked leave to withdraw from the case, as I could not be a party to such an operation. However, by request I remained, after stating before witnesses that I assumed no responsibility for the proposed operation, but would give the anæsthetic and assist. The doctor amputated about one inch above the ankle-joint, and on the third day he requested me to see the case with him, as he believed the prediction I had made that the flaps would slough was about to come true. I found the flesh black, with indications that they would slough where the tubing encircled the leg, advised re-amputation, which both doctor and patient refused. After some six or eight weeks the doctor managed to get a very thin sensitive covering for the ends of the bones. The patient was then taken to the city and reamputation performed, which resulted in a good stump, and some months later the company furnished him with an artificial limb which he can wear with comfort.

Case II. A twelve-year-old boy was injured in the yards by a slowly moving freight train and received injuries to both hands. The left was wrapped in cloths and the right subjected to the regulation lathe yarn. I saw the case an hour later and was preparing to dress the case when the family physician arrived. He asked that I remain and attend to the case, and gave as his opinion that the right would be all right, but he had doubts about the left. As my opinion was exactly the opposite I asked him to modify or change his, but he did neither. On the third day I was asked to see the case and found the right hand and wrist black and swollen, the forearm and arm were also swollen to midway betwen the elbow and shoulder. I advised amputation and performed it one hour later, with good recovery. Left hand restored to usefulness with no sloughing.

Case III. A mill hand had his index and middle fingers severely crushed between rollers. Had the regulation lathe yarn compression for an hour and a half. At the end of this time it was dressed. I was obliged to amputate the hand on the fourth day.

Case IV. A lacerated and contused wound of large toe; compress on about two hours. Dressed antiseptically, but on the second day the tissues commenced to turn black and was obliged to amputate on the fourth day. Patient made good recovery.

Case V. A steamboat man caught his hand in a large hawser; some bones were broken and considerable soft tissues torn away. Black oil was poured over the wound and cloths

bound about it to control hæmorrhage. I saw the patient about eight hours after the injury; dressed the wound with good recovery.

Case VI—IX. Mill injuries to hands, lathe yarn was applied in each case and was on from one to two hours before the parts were dressed. In one case I was obliged to amputate on the fifth day, in the other three recovery was slow with some sloughing.

Case X. A farm hand was run over by mower and right foot badly lacerated. I saw the patient about twelve hours after the injury; hæmorrhage had been quite profuse for a time, with slight oozing afterward. The wound was covered with hog fæces used for hæmostatic purposes, and the deeper parts of the wound were filled with grass, weeds and dirt of all kinds. After cleansing the wound as well as I possibly could I amputated the metatarsal bone of great toe near its proximal articulation. It required thirty stitches to bring the parts together; there was no sloughing and a useful foot resulted.

Case XI. A strong, robust farmer, aged 60, was thrown from a mower; the sickle-bar caught his right ankle, nearly severing it. The cut extended from the median line in front around through tendo Achilles to posterior border outer malleolus; the inner malleous was severed. Believing amputation was necessary I asked for counsel. The doctor arrived about 8 o'clock, some five hours after the injury. I suggested that possibly amputation would be best, but patient and family refused absolutely. My colleague said he did not believe the posterior tibial artery was cut, as there had been no severe hæmorrhage; if it had been patient would probably have died before I saw him; that the light was poor and that we had better postpone dressing until morning. I protested, stating I believed the artery was cut and would take no chances. After giving anæsthetic I removed some clotted blood and dirt, when blood spurted from the artery. The sickle had, besides severing the inner malleolus, passed into joint and sliced off a piece three-eighths by seven-eighths inch from the upper surface of astragalus. Although patient made a good recovery the foot was never useful.

Thus in five cases where a ligature was applied for an unsual length of time, amputation or reamputation was the result. In three cases where ligatures or compression was applied unsually long, recovery was slow, with slight sloughing. In three cases where no unsual compression was applied recovery took place, although the wounds were more severe.

I believe a surgeon or person acting under his instructions who applies a compress so tightly as to cut off all blood supply to the part for over one hour commits a grave, in fact, an inexcusable error. The teachings of Gunn, Parkes and others in the county hospital, Rush and Chicago medical colleges may be recalled:

"Never permit the circulation to be cut off from a part for a period of over one hour if you expect to preserve the integrity of that part."—Moses Gunn.

"Should you find it necessary to control hæmorrhage in a part for a period of over forty to sixty minutes before a final dressing can be applied, avoid severe or prolonged complete compression."—Edwin Powell.

"Severe or protracted compression of the soft tissues impairs their vitality, retards the processes of repair and may cause disintegration and death of the parts."—Charles T. Parkes.

I believe it is the duty of the surgeon to instruct railway employes in the use of simple appliances for first aid. For example, the use of the tourniquet, hæmostatic forceps, mediate or immediate ligation with needle, sutures or ligatures, the preparation and application of antiseptic solutions and bandaging. I suggest that each train have the following outfit for the use of employes in emergencies:

Tourniquet (field or Esmarch).
Scissors (4 or 5-inch).
Needles (five or six, assorted, armed with silk).
Silk ligature (1 yard).
Hæmostatic forceps (two).
Gauze (5 yards).
Absorbent cotton (½ pound).
Bi-chloride tablets (Wilson's, 6).

In my opinion this simple armamentarium would enable properly instructed employes not only to render first aid, but to turn the injured over to the surgeon in as nearly an aseptic condition as they were at the time of injury. Were such recommendations carried

out I believe many cases that have fallen under the surgeon's knife could not only have been saved, but restored to usefulness.

Many damage suits with the accompanying costs and large fees for attorneys could have been avoided if the employe had had proper instruction in first aid, for the suits were largely due to the efforts of fellow employes to help their companions and not to the original injury wholly. So from a financial standpoint I think it will be advantageous to railway companies to see that their employes are instructed along the lines suggested, and to the employes themselves to impress on their fellows the necessity of being posted in the giving of "first aid to the injured."

DISCUSSION.

Dr. J. H. Rothwell: It seems to me that this paper ought to elicit a free and interesting discussion, as it deals with a very important subject. I think the man who gets to an injury, whether railway or not, where there is hæmorrhage, and places an Esmarch bandage or tourniquet on the limb ignorantly, does the patient more harm than people who apply turpentine, tobacco, etc. We have all been called to see cases where someone has applied a rubber tube or a handkerchief has been stuck in the wound to prevent hæmorrhage, destroying tissue that might have been saved. The tissue has become dead, and as a consequence we have to make an amputation higher. A case in point: I was sent for some time ago to amputate a little boy's foot. He was standing on a log chopping between his feet and the ax slipped and penetrated the metatarsal bone of the foot, etc. Ignorant people took the boy's foot, pressed it and applied tobacco leaves to the wound, so that when I saw the case the blood was thoroughly clotted; it had become organized between the two pieces of the foot and the circulation was going on, and the toes were warm. I washed them and dressed the parts antiseptically and got a very favorable result. I have seen many of these cases where the hæmorrhage could have been stopped by a simple appliance without the tourniquet, where people have done a great deal of damage and complicated matters seriously by applying ignorantly a rubber tube or something they ought not to.

Dr. A. I. Bouffleur: Dr. Thornton in his paper said something about the instruction of railroad employes, and it seems to me it is going too far to even suggest the use of any instrument like a forceps or ligature, when so much can be done by the application of a simple pad to the injured part. After the Santiago affray the members of the hospital corps were supplied with what we call first aid dressings. They consisted principally of a pad of antiseptic gauze with some cotton and a bandage, and they went just as rapidly as they could to care for the injured. There was not much fighting in Porto Rico; they had a few small skirmishes, and I believe in one of them something over twenty of our soldiers were shot, and these applications were made immediately after the receipt of the injury, or as soon as the hospital corps could get at the injured. Strange to say, of these twenty cases, in one only was there suppuration. I know of nothing that can be more positive as proof that primary dressing of wounds is very important in our modern teachings. The next point is, that in order to do this it is necessary to make the instructions very simple. You have all seen doctors who became decidedly nervous, to say the least, when confronted with a severe hæmorrhage. If we take railroad employes, who are unaccustomed to that sort of work, they become exceedingly nervous and hardly know what to do. When they are perfectly cool and are called in to receive instructions, it may be all right. But when you have a case in which a man's leg is badly crushed or mangled, you cannot expect them to apply any complicated dressing with much intelligence. Our instructions must be simple if any of our employes are to apply them to the injured, otherwise they will become decidedly nervous or "rattled," if I may use that expression.

I remember of seeing a case brought into a hospital in this city a few years ago with both limbs badly crushed, and the policeman, who had brought the man to the hospital had only one rubber constrictor, and he made a figure-of-eight around both legs. Those men were instructed carefully as to the application of the constrictor; he had been instructed to apply the constrictor, but he did not know how to do it. He simply applied the con-

strictor above the injured part. It would have been better if he had applied a pad to each of the injured parts or to the injured limb. We can have pads made in folds so that they can be applied very readily. The pad is so arranged that even with a constrictor it can be applied around a limb, putting the constrictor over the pad. They could apply a constrictor from three to four hours without endangering the nutrition of the limb below. There are few railroads who have regular methods and schools of instruction. I have never been in an official capacity where I could insist on anything of the sort, and each time the matter has been brought up it has been simply offered as a suggestion. I have no doubt in time the Chicago, Milwaukee & St. Paul Company will take this matter up. When they do take it up, I know the thing will be executed with a considerable degree of thoroughness.

Dr. C. J. Coyne: This matter was up before one of our meetings a couple of years ago, and I think I made a motion that a committee of three be appointed to draw up a set of rules to be posted in every station-house along the Milwaukee system. It was ruled out of order by the chairman, because we had with us at the time the surgeon-in-chief of the Milwaukee road, and a resolution was passed by this body that he be requested to have printed a set of rules and regulations for first aid to the injured on the Milwaukee system, to be posted in every station-house for the instruction of the employes. I think it was also suggested that the physician in charge of the work at the different stations see to it that the attention of the employe was called to that branch of first aid to the injured. I would like to ask Dr. Bouffleur whether the chief surgeon of the road had such a set of rules and regulations formulated and established on the road.

Dr. A. I. Bouffleur: No. Most of you know that Dr. Marks has not been in good health for several years. He has had his health to look after instead of the details of official work, and he has not been able to take up a number of such things. This matter, however, has been taken up by the Special Agent's Department, but it has not been carried out on account of lack of means for proper execution and supervision. There is no need of starting such a thing unless we provide for its being carried out in a thorough manner. If we start it and do not carry it out thoroughly, there would probably be a legal responsibility attached to the negligence to do so.

Dr. C. J. Coyne: If such a set of rules were formulated, and each surgeon of the road was intrusted with the duty of calling meetings at the ends of divisions, and we had regular schools of instruction where employes could be taught the first necessities of relief to the injured, it would be a good thing, especially in the matter of applying heat where there is considerable shock. One of the greatest benefits to the patient comes from the early application of heat to the body, and they have always got hot water about the engine, and heat can be applied, which is a very positive factor in restoring a patient from shock.

Dr. John Binnie: I cannot see the benefit that is to be derived from such instructions. If the company concludes to do anything of the kind it had better furnish instructions in a small pamphlet and give it to the employe or in connection with the train regulations put up at the different stations. In regard to the question of hot water and the case reported by Dr. Coyne, sometimes they have not got anything clean to get it with, but an ordinary tea-kettle will serve the purpose very well. If we will study the matter of how to instruct railroad employes, I think we will come to the conclusion that it is a difficult task to undertake, particularly to do it in the most economical manner, and in a manner that will not jeopardize the company in legal responsibilities.

Dr. D. S. Fairchild: On the Northwestern Road in Iowa they have a large emergency chest at each division station with hot water bags, blankets, elastic bandages for the control of hæmorrhage, plaster-of-Paris and roller bandages, and things of that kind. We observe every little while that somebody is injured near a station that needs one or all of these things, and the employes forget all about them. The patient is perhaps carried on a wagon and needs warm blankets and comforters that are within reach of the station agent. I think Dr. Bouffleur has covered

the matter very judiciously in the suggestions which he makes. There is no use whatever of providing employes with these appliances unless they have occasion to use them and know how to use them. It cannot be accomplished in a short period of time, but must be extended over a long period. At the Northwestern division stations they have a waiting-room in which, during the winter, courses of lectures are given on different subjects, and one of the things we have been trying to do is to give a course of lectures on first aids to the injured. We might get up rules for the guidance of employes, but unless an employe has the ability to learn them in order to pass an examination for promotion he will never master them. They will be stuck in his chest somewhere and he will not know what they contain. By coming in contact personally with the men and giving them a series of lectures at the division stations, after a period of time these lessons can be learned.

Dr. Thornton (closing the discussion): I have nothing in particular to say. I mentioned the use of the forceps in my paper and other things as suggestions for the purpose of drawing out a discussion on this topic, that is, directing attention to the first aid to the injured.

Compound Fracture of Humerus.

Geo. Szlmnak, Stamford; Russian; age 34; admitted November 8, 1898. Examination revealed a compound fracture about the middle of the shaft of the humerus. An operation was advised, but patient refused. Arm was put in splints, and the injured part was dressed with iodoform-bovinine; but in spite of the splints the fragments of bone could not be kept in place, and on the 10th I told the patient that he must consent to an operation or seek advice elsewhere. He consented to an operation on November 11, and it was performed as follows: An incision four inches long was made, beginning at the insertion of the deltoid muscle, which carried it through the wound in an oblique direction, so as to miss the musculo-spiral nerve. The wound was thoroughly cleansed with bovinine-peroxide, and then washed out with Thiersch's solution; the ends of the fragments of bone were rounded off, brought in opposition, and after being drilled were held in position by silkworm gut. The wound was then packed with iodoform-bovinine gauze, and dressed per technique of ulcer dressing. This dressing was removed and renewed every 12 hours until November 24. From November 24 bovinine pure was applied twice in 24 hours. At this time it was found that the bone was united and in a healthy condition. December 2 the silkworm gut was removed and the bone dressed with bovinine pure. December 6 the bone was entirely covered with periosteum and was firmly and thoroughly united. The edges of the wound were now freshened, brought in opposition with four-braided silk sutures, and dressed with bovinine. December 10 the wound has almost united; 28 stitches were removed, and the wound dressed with bovinine pure. December 12 the remaining stitches were removed, and the wound (which was now not much over one-quarter inch long) was dressed again with bovinine pure.

December 20 patient discharged cured, with his arm restored to its full usefulness. The rapid healing of this is unexampled, except in the two cases preceding, and was undoubtedly due to the local nutrition afforded by the auxiliary blood supply.—Mod. Medicine.

In bad cases of frostbite of the hands or feet, do not be in a hurry to amputate. Rest in bed and the most careful asepsis will often allow you to save fingers and toes that would be sacrificed otherwise. The asepsis must be thorough; shreds of necrosing tissue must be duly removed and the patient's strength be upheld by careful nutrition. Under such conditions, if gangrene becomes established it is usually found that the line of demarcation is much farther toward the extremity than was anticipated.—Int. J. Surg.

If you believe that your operation has been a clean one, leave the wound alone, if not an infected one. The best surgeons usually apply but one dressing, the first. When this is removed the stitches are taken out and the wound only needs a clean covering for a few days.—Int. J. Surg.

When you have blood upon your hands, first wash them in pure water. Using soap at first is a mistake, as soapy water does not dissolve blood rapidly. Clean water and a nail brush should come first, next soap.—Int. J. Surg.

Carriers.

A passenger who knowingly rides on a mixed train assumes risks incident thereto. Olds v. New York, N. H. & H. R. Co. (Mass.), 51 N. E. 450.

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THE ANNUAL MEETING.

A meeting of the executive board was held in St. Louis on March 4 for the purpose of fixing a date for the annual meeting and transacting other business. In deference to the wishes of the local committee, the date was fixed for May 31, June 1 and 2, 1899, and the place of meeting Richmond. Dr. C. W. P. Brock, who has been appointed chairman of the committee of arrangements, writes that this date has been selected as it will give two or three days' sightseeing along the C. & O. before the meeting of the American Medical Association, which meets in Columbus, June 6-9. Dr. W. D. Middleton of Davenport, Ia., chief surgeon of the Chicago, Rock Island & Pacific Railway, has accepted the chairmanship of the committee on transportation.

Several papers have been promised already, and in addition to the miscellaneous program there will be a Symposium on Burns and Scalds, which promises to be as great a success as the one on shock was at the Toronto meeting.

The attendance will be very large, undoubtedly, and the place of meeting this year should draw out a good representation from the southern and eastern states. As a result of the successful meeting in Toronto the Canadian members, we are assured, will be on hand in large numbers.

The "City of Seven Hills," which has been selected as the place of meeting, is of great historic interest. The first English settlers, after landing at Jamestown, went up the river as far as the present site of Richmond, when their explorations were stopped by the falls which now furnish the city with power. During the Revolution the city was invaded by the British under Tarleton. In the late war the country around the city, and sometimes the city itself, was the theater of great military events, which are perpetuated by the names of Seven Pines and Mechanicsville of Cold Harbor and Malvern Hill. Indeed, every road from the city leads to a battlefield. So the city, with its memories of the hoary past, its bustle of the present, will be a fit meeting place, unsurpassed in interest by any hitherto selected.

AMPUTATION WITHOUT HÆMOSTASIS.

On page 399 of the present volume of this journal will be found the report of a case by M. Desguin in which he made a Syme's amputation without using any hæmostatic measures. In a recent communication to the Belgian Surgical Society he reports another case, this time through the thigh. The patient was a man 24 years of age; the Esmarch band was applied, and when the operation was ended no vessels were tied, a slightly compressing dressing was applied and the stump placed on an inclined plane. The case ended without any untoward incident and union resulted by first intention. The author cites the case to show that in many instances it is possible to sever even important vessels without any considerable hæmorrhage resulting. As the New York Medical Journal, from which we gather these facts, remarks: "It is not, however, stated why so extraordinary a proceeding was considered desirable, the danger

of which is recognized by the author himself, when he remarks that the procedure is not an example which can be recommended for imitation in all cases."

Translations.

LACERATED WOUND OF THE FOREARM—SUTURE OF TENDONS AND NERVES.

By Dr. F. Dejardin of Liege.

(Translated for The Railway Surgeon.)

This patient, while working at a machine, accidentally set it in motion and his right forearm was caught between the shafting and the handle; the latter, which was flat, not round, penetrated the flesh. When admitted to the English Hospital the following lesions were found: The skin was lacerated along a line from above down and out, the edges were markedly contused, the aponeurosis was opened widely and nearly all the superficial muscles were involved. The belly of the supinator longus was partly severed, the bellies of the pronator teres, the palmaris longus et brevis and the f. carpi ulnaris were divided and much contused; the tendons of the flexor sublimis were divided, also, and those of the f. profundus and f. p. pollicis severed at their junction with the muscle proper. The radial and ulnar arteries and nerves were intact, but the median nerve was severed and the two ends retracted. The wound, of course, was very dirty.

After cleansing the skin and wound as carefully as possible I united the ends of the median nerve, then the tendons of the deep flexor and the thumb flexor to their muscular bellies. On account of their bruised condition, and in order to avoid the inevitable gangrene, I was obliged to sacrifice most of the superficial muscles; their tendons were then united either laterally or to the belly of the deep flexor (tendon grafting). Ligature of small venous and arterial branches completed the operation.

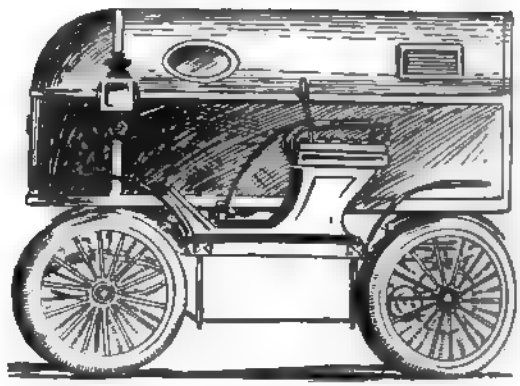
At the first dressing, July 13, two small gangrenous spots were found in the skin. These were removed and the after history was unimportant. Massage and warm baths were used and the patient left on September 20, resuming his work one month later.

As you see, the mobility and sensibility of the arm are very satisfactory. The patient has nearly all the usual movements of the hand and fingers; the thumb and index are still somewhat stiff. This alone is a good result considering the great loss of muscular substance. Sensibility is not very acute in the last two phalanges of the index finger, especially on the palmar surface. However, it has returned so rapidly that we hope it will be entirely restored soon. You will also notice that the sutured tendons are not adherent to the skin, which I attribute to the grafting. In short, the results are surprising.—Ann. Soc. Belge de Chirurgie, 1899, p. 353.

Miscellany.

An Automobile Ambulance.

Some philanthropic citizens of Chicago have given an automobile ambulance to the Michael Reese Hospital as part of the plan for enlarging the hospital and otherwise bringing it up to date. This is said to be the first vehicle of the kind ever constructed, and



SIDE VIEW OF AUTOMOBILE AMBULANCE.

a good idea of its appearance may be had from the accompanying cuts.

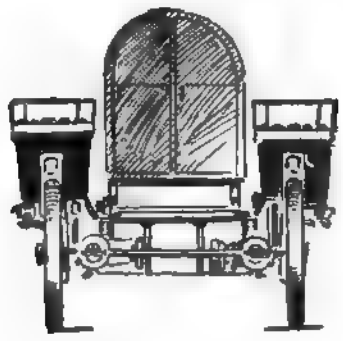
The ambulance weighs 1,600 pounds, and its speed will approximate 16 miles an hour. The body of the vehicle is set on a separate set of springs, which reduces the jar and jolting of the occupant to a minimum.

In the interior is fitted up a medicine chest and on each side of the stretcher places are provided for all the hospital appliances and paraphernalia.

The driver will sit on the left side, as is

done on all automobiles, and the attending doctor will be seated on the right. The two windows are so placed that both the doctor and the driver can see the patient at all times without leaving their seats.

The body of the ambulance is made of seasoned ash, highly polished. The inside of



AUTOMOBILE AMBULANCE—REAR VIEW.

the cover is lined with a veneer of thin poplar, thus making drafts an impossibility. The wheels are fitted with heavy pneumatic tires.

The price, including a double set of batteries, is $2,775.

Extracts and Abstracts.

The Operative Relief of Brain Compression from Intracranial Hæmorrhage.

By James P. Warbasse, M. D.

In considering the question of compression of the brain from hæmorrhage within the cranial cavity, it must be borne in mind that the brain is enclosed in an unyielding case, which is completely filled by its contents; the accumulation or development of any abnormal material within the cranium, therefore, must displace volume for volume the normal contents of that cavity. Moreover, the brain-tissue itself is practically incompressible, and for that reason intracranial pressure-producing conditions exert themselves first upon the fluid contents of the skull. These are the blood contained in the capillaries, vessels, sinuses, and the cerebrospinal fluid. The first symptoms of diffused compression upon the brain are the symptoms of cerebral anæmia, due to the emptying of the capillaries. As the compression increases the veins and sinuses become compressed, the arterial resistance is increased, and the cerebrospinal fluid is crowded into the basilar ventricles and into the spinal canal. These phenomena produce a characteristic train of symptoms, and unless the compression involves particularly the motor or some other distinctly localized area, they are quite as characteristic of cerebral anæmia as though due to some extracranial cause. The most constant symptoms are dizziness, stupor and unconsciousness, and these are the signs of cerebral anæmia. It should also be observed that these symptoms of local anæmia are practically the same whether due to hæmorrhage, depressed fracture, or the presence of serum or pus. On account of the incompressibility of the brain and the unyielding character of the skull, foreign matter can occupy the cranial cavity until all of the removable fluids have been expelled, but long before this takes place death has occurred as the result of anæmia of the vital centers. Pagenstecker conducted a series of experiments to determine the effects of foreign pressure introduced inside of the skull. He injected wax between the skull and the dura mater, and found that the minimum amount which could be introduced without causing symptoms of compresssion was equal to 2.9 per cent. of the volume of the normal contents of the cranium, and that the maximum amount which could be introduced without causing fatal symptoms was 6.5 per cent.

The time allotted to this paper does not permit of a full discussion of the symptoms of compression. The signs of hæmorrhage of traumatic origin occurring between the skull and the brain will be briefly considered. The symptoms mentioned above vary with the degree of compression. Dizziness, muscular incoordination, and slowness of the intellectual processes are the earliest signs. As the pressure increases, stupor and unconsciousness supervene. When a patient has sunk into a state of unconsciousness from compression, a recovery from this state will not occur unless the compression is relieved. The changes in the appearance of the pupils is a symptom of much variability, inequality in the size of the pupils is usually observed. In six cases reported by Charles Phelps, the pupil on the side of injury was dilated, and contracted on the opposite side; while in two cases the pupil was contracted on the side of injury and dilated on the opposite side, the hæmorrhage in each case being epidural and derived from the middle meningeal artery. This author in his recent work on "Traumatic Injuries of the Brain," states that there seems to be no change in the pupils which is positively characteristic; and that in three cases in which both pupils remained normal, the hæmorrhage was epidural in one, pial in one, and cortical in the third. Wiesmann observed that when marked dilation of one pupil occurred, in twenty out of twenty-four cases, it was on the side upon which the extravasation existed.

A slight rise of temperature is an almost constant sign. This may be due to absorp-

tion of fibrin ferment or to irritation of the thermal centers. The slowing of the pulse-rate is one of the most characteristic symptoms of brain pressure. This is due to the greater quiet of the muscles of the body, due to the stupor and to the pressure effects upon the cardiac centers. By dividing the pneumogastric nerves in animals whose pulse-rate had been slowed by brain pressure, Kehrer observed an immediate acceleration of the pulse. A slowing of the respiration is also present. Vomiting is usually observed during the early stages before the compression has reached any considerable degree. The signs of venous obstruction in the optic nerve are of great diagnostic value.

To illustrate the symptoms and the operative relief of cerebral compression from hæmorrhage, I will relate briefly the histories of two cases which are at present under my observation, which occurred in the service of Dr. Pilcher in the Methodist Hospital, and upon which I operated for the relief of these symptoms.

Case I: Male, age fifty-three. This man fell from a wagon, striking upon his head; he was totally unconscious for several minutes. When brought to the hospital by the ambulance surgeon he was in a condition of stupor and could only be aroused with difficulty. The skin was cool and bathed in perspiration. The pulse-rate was normal, there was no inequality of the pupils, nor was there bleeding from the ears, nose or mouth. No fracture of the vault of the skull could be detected. While being brought to the hospital the patient vomited repeatedly, his temperature was 99.4 degrees F., and pulse 70, and the respiration 20 on admission. For the first twenty-four hours the mental condition remained about the same. The patient lay in a stupor, from which he could be aroused by speaking sharply. He could be made to answer questions, but immediately relapsed into his original condition. Gradually he developed signs of pain in the right side of the head and back of the neck, from which he seemed to suffer intensely, and of which he bitterly complained when aroused. His pulse-rate steadily decreased. On the second day it ranged between 46 and 60, and on the third day it had gone down to 38 beats per minute. There was muscular weakness on the left side, and the left leg responded to irritation much more slowly than the right. Here were the symptoms of a steadily increasing brain pressure, localized particularly upon the right side. Accordingly the skull over the temporoparietal region was exposed by a wide curved incision extending from the zygoma in front of the ear upward, across the parietal eminence, and ending behind the ear in the parieto-occipital region. The flap was turned down, and the skull opened by trephine over the middle of the posterior central gyrus. The dura bulged but slightly more than normal. It was incised, and a small amount of bloody serum escaped. A second button was removed anterior to this and over the posterior branch of the middle meningeal artery, but even less bloody serum was found here after incising the dura. A third opening was made through the skull below and posterior to the first and over the fissure of Sylvius. On incising the dura there was a freer escape of bloody serum took place, and it could be distinctly discovered that the bloody fluid was oozing up from the direction of the base of the brain. After the incision of the dura mater the patient's pulse-rate increased until it became normal. For purpose of drainage a smaller trephine opening was made through the squamous portion of the temporal bone in front of the ear, and as low down as the zygomatic process would permit, thus opening the skull on a level with the base of the brain. A small drainage tube was carried just through the dura in this opening. The wounds were closed as usual. On the day following the operation the pain in the head had disappeared, the pulse-rate had gone up to normal, the stupor had subsided, and the patient's mental condition was normal. The bloody discharge continued for about forty-eight hours. On the third day the tube was removed. The wounds healed without complication, excepting the signs of some necrosis of the bone edges. The patient was discharged from the hospital, and referred to the out-patient department May 16, three weeks after the date of his injury. This man had in all probability sustained a fracture of the base of the skull, from which had taken place the above described bloody oozing.

Case II: Age fourteen. Three days before his admission to the hospital this boy had been struck upon the head with a baseball bat. He lay in a state of coma for an hour, at the end of which time he regained a partial consciousness which amounted to stupor. He lay in this condition for three days without any improvement, and was then brought to the hospital. He could be aroused from his stupor sufficiently to answer questions in a desultory manner, but would drop back immediately into unconsciousness. He could be aroused sufficiently to stand on his feet and walk when supported, but if permitted to stand alone he would quickly lapse into stupor and fall. Ataxia was the only muscular symptom; the pupils were of equal size. Directly above and behind the left ear over the parieto-occipital region was a soft hæmatoma beneath the scalp the size of the palm of the hand. No depression of the skull could be felt under this. The temperature was normal, pulse 80, respiration

20. A diagnosis of intracranial hæmorrhage posterior to the left motor area was made. The skull beneath the area of contusion was explored by a wide curved incision, the broken down blood beneath the scalp liberated, and the flap turned down exposing the bone. Several lines of fracture were discovered about the center of the parietal bone. The skull was opened by removing an area of bone 5 cm. by 3 cm. in size. This exposed a clot of blood between the dura and the skull. The thickest part of this clot lay over the supramarginal gyrus and the inferior parietal lobe, and gradually thinned out toward its periphery. It was about 10 cm. in diameter, and 1.5 cm. thick at its central part. It was peeled away from the dura, to which it was closely adherent. There was no wound of the dura. The bleeding had come from the diploe of the skull, from which a vigorous hæmorrhage occurred upon removing the bone. The wound was closed in the usual manner, uncomplicated healing followed, and by the end of twenty-four hours the stupor had subsided and the patient was restored to a normal mental condition. At the end of ten days, on June 15, the patient was discharged from the hospital.

These two cases suffice to illustrate the prompt recovery which may be expected in cases of cerebral compression when the cause of the symptoms is promptly removed.

DISCUSSION

Dr. Warbasse: I think that out of justice to myself a word of explanation may be in order. Four days ago I was telephoned to by the president, who asked me to read a paper before this meeting. I was then engaged in work that was demanding every spare moment of my time, and so on this 21st day of June I am compelled to offer excuses for the shortness of the days, and to apologize for presenting a paper which is imperfect and incomplete.

I have reported only these two cases, for the reason that they are immediately in my mind, though it has been my fortune to have operated upon a number of cases with intracranial hæmorrhage. I am able to present these patients who are still under observation.

PATIENTS PRESENTED.

This is case No. I, in which the compression was so great that the man's pulse-rate sunk to 38 per minute. Here is seen the scar of the incision, and the trephine openings can be felt. In front of the ear the final trephine opening can be palpated.

This second case is the boy who lay for three days in a stupor without his parents having had a doctor to see him. They became alarmed that he did not recover, and he was sent to the hospital. This boy's blood clot involved the area immediately posterior to the motor area, and I presume that his ataxic symptoms were partially due to compression upon the posterior lobes of his brain and the cerebellum.

Dr. H. B. Delatour: Mr. President, cases of intracranial hæmorrhage are certainly among the most satisfactory we have to deal with. We find our patients frequently at what apparently is the point of death, and by an operation of trephining and removing the clot we promptly see a recovery follow. The recovery from symptoms is usually very prompt. We find, as in the first case exhibited, the doctor says the pulse-rate was down to 38 or 40, and in such cases as soon as the pressure is removed from the brain, while the patient is still under the anæsthetic, we frequently see the pulse go up to normal and gradual or rapid improvement take place.

I recall one case that came into my service at St. John's about a year ago, a little girl who a week before she was brought into the hospital had fallen down the cellar stairs. The child cried a good deal, and was lifted up and brought upstairs and lay around for a little while, and then became semicomatose, and yet began to cry. If I remember correctly she had no medical attention at all during the week. At the end of a week she was brought into St. John's in a condition of semicoma, from which you could arouse her sufficiently to get a reply, but she kept up a continual moaning or crying. Anodynes had no effect; there was no mark on the skull as evidence of depression; there was a slight abrasion behind the right ear, and she continually placed her hand in that neighborhood; there was no paralysis. The diagnosis of probable intracranial hæmorrhage was made, a trephine opening was made posterior to the ear, and a clot some two inches in diameter was found, the result of rupture of the lateral sinus on that side. From the time she came out of the anæsthetic until she left the hospital two weeks later there was no more crying nor any more complaining of headache.

The amount of compression that the brain can undergo without destroying life is marvelous. I remember one case of a man in the Norwegian Hospital, in which the thickness of the clot was at least an inch, and extended over nearly the entire left hemisphere. After removal of the clot through a rather large trephine opening the patient made a very excellent recovery.

These cases differ very materially from cases of epilepsy. I think the general experience of men who have trephined for epilepsy resulting from old depressions or injuries is one of much dissatisfaction. In the experience I have had of trephining for epilepsy the final results have been very unsatisfactory,

and I can only remember one case in which there was permanent improvement, while in theses cases of hæmorrhage the recovery is prompt and satisfactory in every respect, whereas if trephining is not done and the clot is allowed to remain, the prospects of epilepsy developing and becoming incurable at a later period are unquestionable.

It is a very important matter to recognize that it is not necessary for fracture of the skull to take place in order to have intracranial hæmorrhage; it is not necessary to have a simple fracture—much less a depressed fracture. The main hæmorrhage is usually extradural and can be easily controlled.

Dr. William Browning: Though not a surgeon, I should like to say a few words on this subject. It is certainly a most important one, and, of course, it has been well handled.

Now, if you go to any of the places where epileptics or cripples or the demented congregate—to the special clinics, hospitals or institutions—you will find a great number with a history of early accident, and where, so far as we can tell by reasoning backward from the present state of the case, a prompt operation soon after the accident would have prevented the occurrence of such conditions. Therefore, this class of operations are not simply life-saving, but by the prevention of permanent mental and physical injury they are also cripple-sparing. It is a great work if by prompt action they can be saved, and I am sure that at the present time this can be done in a goodly number of cases. If we find evidence of brain pressure, whether the traumatic lesion can be definitely located or not, I believe that in most cases operative relief can be given. We should attempt it; we may not succeed, but the probabilities are we shall, and, on the other, if we leave the patient alone the chance of permanent recovery is not good.

I did not hear the first part of the paper and so may go over one or two points unnecessarily. The title of the paper is aptly chosen. It does not say traumatic hæmorrhage of the brain—for evidently one of his cases would not come under that head—but traumatic apoplexy. In other words, an injurious pressure may be exerted on the brain, not only by a simple hæmorrhage, but sometimes by serum or cerebrospinal fluid, whether the latter be either produced or retained abnormally. There are liable to be evil effects in either case, though probably other material is absorbed more readily than blood. At any rate, when this pressure is kept up for much length of time the brain is injured; by relieving this we accomplish good, whether it is blood we let out or something else.

In one case I notice he had recourse finally to the favorite site, i. e., opening over the main trunk of the medidural artery. This is the generally accepted spot where you do not know any other point—where there is no other indication, and yet you feel sure there is brain pressure.

[*Concluded in next issue.*]

Injuries to the Urinary Organs.

By J. Henry Dowd, M. D., Buffalo, N. Y.

Wounds of the kidneys, ureters and bladder are occasionally complications of railroad injuries, and especially of the kind where compression of the abdomen and pelvis follow squeezing between buffers or freight cars.

Statistics tell us that injuries to the kidney are less common than those of the liver, all things being equal. Ehler's table of 152 cases gives subcutaneous, 90; gunshot, 50, and incised, 12. This shows that the first occurs almost twice as frequently as the open variety. The most common cause of injury is falling from a height. Other causes are blows, kicks, crushing by wheels passing over the abdomen and falling against some stationary object. The cortex is always involved, the lesion extending in some cases to the medullary portion, causing only subcapsular hæmorrhage or complete rupture of the organ. At times the lesion is as though from an incised wound, at others it is irregular or pulpy.

The peritoneum covering the kidney is rarely torn in the adult. As a general thing hæmorrhage is present and it may confine itself to the substance of the kidney, the fatty covering, or break through this and extend far and wide, separating muscles and fascia, even finding its way into the peritoneal cavity.

Symptoms—Of these, shock is the most pronounced. This may vary in degree from very slight to the most profound, and right here it may be well to state that shock from injuries of the kidneys and bladder is more pronounced than from wounds of any other of the internal organs. The facial expression, pulse and other indications will correspond to the amount of shock present and also the hæmorrhage. Pain is always present and unless masked by other injuries more severe, will be located in the affected side, possibly radiating along the course of the ureter and extending into the testicle. When the latter is very severe it is generally due to clots passing through the ureter. Hematuria is a constant symptom and by the amount it is safe to judge of the severity of the lesion. When the ureter has been ruptured the blood and urine may find its way into the abdominal cavity. Urine is diminished, and at times complete suppression takes place, but after a few days the normal quantity is reached. More or less ecchymosis is present and a prominent authority

says, "The appearance of this at or near the external abdominal ring is positive evidence of kidney lesion." Infection can pass upward from the bladder and cause suppuration with symptoms accompanying such conditions.

Treatment—In this, one should be prepared to combat shock, check hæmorrhage or cut down and remove the injured organ at once. To fulfill these requirements rare surgical judgment is necessary. As a routine measure rest in bed, hot bottles, anodynes, sedatives and strychnine are indicated. If there is much hæmorrhage no drugs are better than the free use of ergot and hamamelis. Preference should be given to a tight bandage (the injured side being padded) rather than ice packs. Vomiting must be controlled, as it facilitates bleeding.

Food should be limited in quantity and the bowels moved by enemata about every third day. It is well to put the urine in the most antiseptic condition possible, so as to avoid any possibility of infection. Guaiacol, in three to five drop doses three times a day, prevents the formation of bacteria. The most important question is, when shall we operate? Should the hæmorrhage steadily increase and the patient become rapidly exsanguinated, with sighing respiration, small rapid pulse, great restlessness or large swelling rapidly form in the loin, something more heroic must be done at once.

The kidney should be cut down upon, and now only the operator can be the judge whether a rent or bleeding vessel can be secured, or if the organ should be removed. At times the bladder will fill with blood clots which will cause much discomfort, produce straining and facilitate cystitis. As it is impossible to withdraw these by the aid of catheter, perineal section is advisable. It is positively without danger and may save the patient's life by preventing cystitis and pyelonephritis. The thermometer must be used faithfully, as this may be our first inkling of inflammatory trouble.

Injuries to the ureters generally occur at the time of operation on the uterus, but sixteen cases are reported where injury has taken place from other causes. How these small movable tubes are injured by external violence is a question yet unanswered, but it is supposed to be from the forcible pulling of the kidney or by its being pressed against the first lumbar vertebra. Early diagnosis is impossible, and, except the injury be found while operating on the kidney, the only positive symptom is the appearance of a swelling, due to an accumulation of urine which leaks from the rupture. This may occur at any time from seven to thirty days after the injury. Occasionally a small amount of blood is found in the urine. There has never been an early operation reported for injured ureter, except where it occurred at the time of operation, or was found after exposing the kidney. Where such a swelling develops aspiration is necessary and should a urinary fistula result it will be necessary to cut down and close it, or, if possible, form a new canal.

The bladder being protected as it is by the bony walls of the pelvis and in front by very elastic muscles insures its almost perfect safety from direct injury, although this at times does occur. Furthermore, the bladder when empty offers such slight resistance to external violence that it is rarely if ever injured in this condition.

Lesions may be classed under three heads: Intraperitoneal, extraperitoneal and subperitoneal. In the intraperitoneal variety it is found that the rupture usually occurs at the upper and posterior portion, i. e., where the viscus when distended comes in contact with the sacral angle. In the extraperitoneal variety the rupture is usually in front, i. e., that portion exposed and partially behind the pubes. The cause of injury may well be spoken of under two conditions—namely, external and internal violence. It will only be necessary here to mention those of the second class, over-distension from whatever cause being the most prominent; straining, lifting and the like being others.

A predisposing cause is generally present in the shape of ulceration, sacculation or atony of the walls, and these secondary to some obstruction, let it be stricture or enlarged prostate.

The second or especially interesting cause to this body is some external violence applied over the bladder, such as crushing of the pelvis, kicks, sudden falls from a height, or the kneeling upon the abdomen by another. The bladder has been ruptured during child-birth, but the careful obstetrician will always see that it is empty at this time. A case has been reported of rupture during anæsthesia, preparatory to operation for retention.

Symptoms—The patient is liable to fall and cannot get up, complaining at the same time that he or she felt something give away inside, from which relief was experienced. Great prostration rapidly ensues, the face becomes blanched, nose pinched and pulse very rapid. Great pain is complained of over the lower abdomen, and a constant desire to urinate, with only a few drops of bloody urine escaping. A catheter, if passed now, will only bring forth a few drops of the same fluid. At times the extravasation of the urine is very marked, burrowing between muscles and fascia in all directions, and when intraperitoneal, is quickly followed by peritonitis. The fact should be remembered that in cases of injury to the pelvis

or other parts, and again at times owing to the peculiar actions of these wounds, symptoms indicating rupture may be entirely wanting. It is, therefore, very important that a person in whom rupture or injury is suspected, be confined to bed and watched closely, for at any time the symptoms in all their fury may break forth. Outside of direct violence, such as received in a railroad or other accident, most cases of rupture of the bladder occur while the patient is intoxicated, the viscus being distended, owing to the diuretic action of alcoholic beverages. A careful history from patient or friends will aid greatly in forming a diagnosis.

Treatment—Rupture of the bladder is a grave condition to deal with. Of the 315 cases collected there were but 52 recoveries. Of these 52 cases 42 were extraperitoneal. The question of extra or intraperitoneal tear is often impossible of differentiation; therefore, if we can expect to give the patient any hope, the opportunity should not be lost in temporizing. Localization of the rent plays an important part. In all cases it is expedient to at once make a perineal section. We may now be positive of one thing—there will be no further extravasation of urine, and it is more than probable that we may through the perineal wound find the tear in the bladder, and thus form an opinion at once as to whether it is of intra or extraperitoneal character. If this fails us the next step should be an incision through the abdominal wall down to the peritoneum. If urine is found we may be pretty sure that we are dealing with an extraperitoneal tear and that the contents of the bladder is escaping below the anterior fold of the membrane. It may be of great advantage if the peritoneum is gently lifted from the anterior wall of the bladder, as now urine may be found oozing up from the cellular tissue, which fills Retzius' space, this positively indicating the tear to be extraperitoneal. If no urine appears the perineum should be opened at once, the rent sought for, and when found closed tightly, the peritoneal cavity being thoroughly flushed with distilled water. It will be unnecessary to describe the technique of an operation of this description further than to say that we should deal with these tears similar to those of the intestines, only do not let the sutures pass through the mucous membrane, so as to enter the cavity of the bladder.

In all cases a tube should be left in the bladder for at least a week, the distal end being immersed in a jar containing formaldehyde solution, which should be changed every four hours. In this way we may be able to judge as to the amount of urine passing, also as to the degree of hæmorrhage.—Buffalo Med. J.

Antiseptic Silk and Catgut Sutures.

By Dr. Robert Thomalla (Berlin).

Every surgeon is anxious to possess completely antiseptic sutures, and I intend to report the following on a suture which has not only proved to be completely antiseptic, but also remains antiseptic, and acts antiseptically in the puncture canal. I prepare a Formalin-gelatin solution, in this I place sterile silk, which naturally absorbs the Formalin-gelatine, which is still liquid. After some time the silk is taken out of the Formalin-gelatine solution, is dried in a sterile room and rolled up. When I stitch with this Formalin-gelatine silk, the living cells cause the immediate dissolution of the Formalin-gelatine in the puncture canal, thereby liberating Formalin. Any bacteria which may have got on the silk before the operation are bound to be destroyed by the liberated Formalin in the puncture canal. In order to practically prove this theoretical supposition, I spread pus on a number of silk threads which had been prepared as mentioned above. On the first occasion I took the pus from a whitlow, upon the second from a boil. With this silk covered with pus I stitched up a dog on which I had inflicted a flesh wound. I treated the wound aseptically, bandaging it simply with sterile gauze and cotton wool without using any antiseptic. When I removed the stitches of the superficial wound on the sixth day I could not observe the least sign of pus in the puncture canal; out of one puncture canal only could I press out one drop of serous, not purulent, liquid; the superficial wound itself, however, suppurated. The reason for this lies in the fact that the pus which was put on the silk had by degrees come into contact with the wound, but as the living cells of the margin of the wound have no lasting effect upon the Formalin-gelatine, and also were not able to dissolve same, the Formalin could not be liberated, and therefore the cocci had the chance of further development on the surface of the wound. When stitching the next wound (on the same animal), after having done the stitching part with the silk covered with pus, I powdered the surface of the wound with Glutol. This time the wound was healed by first intention, and in the puncture canals again no pus could be found. I now put on the Formalin-gelatine silk, cultures of staphylococcus and streptococcus. Stitching with this thus infected silk, I firstly again treated the wound aseptically, but powdered with Glutol one of the two inflicted wounds and the puncture canals belonging to it. It happened that the dog had torn off the bandage on the third day, and as I was prevented from

looking after him, the dog was left for three days without a bandage. On the sixth day I found both wounds healed by first intention. On the wound, upon which a Glutol scab had formed, and which could not be reached by the dog's tongue, no pus could be pressed out of the puncture canals or from the line of the wound. Upon the other small wound, however, which had not been powdered with Glutol, one drop of pus could be squeezed out from a puncture canal, and that from the orifice only; the wound also gaped in one place after the stitches had been removed, and pus could here be observed. I attribute this to the following: The Formalin-gelatine which clung to the silk was completely dissolved within twenty-four hours by the living cells, although it took several days to be absorbed. The formaldehyde which was originally in combination with gelatine (provided that no bandage had been applied) becomes liberated and partly used up, by means of gradual evaporation, so that in the course of three or four days hardly any trace of it can be found. After the dog had removed the bandage he may have made sore or infected the wound and the one puncture canal, by rubbing, after which a slight suppuration on these places resulted. When there was a Glutol scab on the wound, or opening of the puncture canal, no infection had taken place, and therefore no suppuration in the puncture canals could be observed. A number of further experiments with the same silk fully confirmed my supposition. Every one of these wounds had healed by first intention, and I could not observe any more pus in the puncture canals. When removing the stitches, on the third to the fifth day, I could always take from the puncture canals a little lump of non-absorbed, dissolved gelatine (which should not be taken for pus), which however, could not be observed on the sixth day nor later, as it had then been absorbed. This induced me to cover catgut also with Formalin-gelatine. The absorption of catgut being variable, in my opinion the catgut should be preserved against absorption for several days, seeing that the layer of gelatine which surrounds the catgut took about four days to be absorbed. I have never observed any absorption of this so covered catgut, although I always left it lying in the puncture canal for eight to ten days. To this must be added the complete antisepsis which I could prove equally, in this so prepared catgut, as I did in the Formalin-gelatine silk.

After having proved by such experiments on the dog the antiseptic action of this silk and catgut, I could start the employment of these sutures, which were always kept dry, on my patients. I have used them in more than a hundred patients, and not once have I been able to observe pus in the puncture canals, although I never cleaned the silk previous to its employment with an antiseptic liquid, but used for stitching the dry Formalin-gelatine silk, which was, of course no longer covered with cocci. We concluded therefore, from the above, that the surgeon can carry these sutures with him, wrapped up in a clean paper, having them always ready for use, without running the risk of infecting the wound by this silk. In spite of this, it will be well to take care that, if possible, no pyogenic organisms are introduced into the puncture canal, and in order to attain this I have constructed the following apparatus, which is suitable for the preservation of this silk, etc., in the surgery or outdoors, and which can be carried in the pocket.

The above figure shows a round glass vessel about 7 to 8 cm. high, the top of which is closed and made air-tight by an India-rubber plug (a). From this India-rubber plug leads a vulcanite or glass rod (b) to a perforated glass or china partition (c), by which the whole vessel is divided into a larger upper space (d) and a smaller lower space (e). If the vessel is closed by the India-rubber plug (a), the rod (b) presses in such manner on the perforated partition (c) that it cannot move. After the whole vessel has been antiseptically cleaned—which can best be done by a Formalin solution—I put into the lower space (e) a few of Schering's Formalin tablets (p). The evaporization of formaldehyde from these tablets preserves the upper space (d) and what is in it—*e. g.*, silk (s), etc.—antiseptically. My antiseptic silk and catgut can therefore at all times be carried about in an always antiseptic state, and in the upper space (d) a few needles may be kept. The silk and catgut may also be rolled round the rod (b).

For the operating room in the hospital or clinic I have constructed a similar but larger apparatus in various sizes, in which, besides the stitching necessaries mentioned above, instruments can be inserted, and instead of the Formalin tablets a Formalin solution of 1 to 2 per cent. may be poured in the lower space and be allowed to evaporate. When operating, this vessel is placed on the operating table, and the silk or catgut, which remains in a dry state, is taken out and used at once.

If—which may be possible—at the moment of the operation, bacteria should come on the sutures, they are destroyed in the puncture canals, as proved above. Not having much opportunity, I leave it to others to prove in how far this Formalin-gelatine catgut may be used in operations of the intestines and stomach.—The Therapist.

Two Cases of Joint Injury—Shoulder and Knee.

By Hal C. Wyman, M. S., M. D., Detroit, Mich.

A man, aged sixty-four years, a Canadian ditcher and farm hand, was riding in a cart last February when the horse became unmanageable and the man and a companion were thrown out. The ground was quite hard and he struck on his back and shoulders and in consequence suffered great pain, so severe through the shoulders that he could not get relief even after being attended by a skillful Canadian physician for several weeks. He could not raise his elbows from his sides, but could move his hands and forearms naturally. When eating he raised his food with fork or spoon until the forearms were flexed on the arms and then inclined his head forward until he could reach the food with his lips.

Some of the physicians whom he consulted thought his shoulders were dislocated and that they should have been reduced at the time he was thrown from the cart, and he came to me for advice as to replacing them. He entered the Emergency Hospital on the 15th of April, 1898, and appeared in my service the next day. His general appearance being thin of build and bent forward, indicated a man much older than he is. I could not learn that he had ever had any bad health. His teeth were sound and his skin, though wrinkled, was clear and elastic.

Both shoulders were flattened from the acromion to the deltoid depression and there was absolute flatness where the deltoid muscles should make the shoulders smooth and round. The head of the humerus could be felt in each axilla. When passive movements of the shoulders were made the articular surfaces could be made approximate, but as soon as the movements ceased the head of the humerus dropped away from the glenoid fossa and appeared in the axilla tilting the elbows on each side a little away from the body in a position quite characteristic of dislocation downward of the humerus. Both deltoids are atrophied so that it is quite impossible to get any contraction from them. The case is to me unusual. I have never before seen an injury of this sort affecting both shoulders. Apparently the trophic and motor nerves on each side are paralyzed in their relation to the deltoids.

A man forty-two years old, by occupation a builder, fell in getting out of a wagon and struck his knee upon a sharp edge of the hub two years ago. The limb immediately became useless and the man was carried to his home in great pain and unable to walk. His physicaian was called and found a deep indentation of the skin above the attachment of the quadriceps extensor femoris to the patella and so close to the latter that he could easily feel that the conjoined tendons of this muscle were entirely separated from the patella. The muscles were retracted up the thigh and he could not make the tendons approach the separated patella. The skin was not broken. He was reluctant to open it and suture the tendons to the kneepan for fear of subsequent inflammation of the knee-joint. The parts were badly contused and the doctor thought the joint fluids had escaped into the adjacent tissues. He put the injured limb on a straight splint and endeavored to make the severed bone and tendon approximate by securing it with a roller bandage. There was a great deal of swelling of the knee and pain for four weeks after the injury, but at that time it began to disappear. He continued the use of the splint for three months and then he was allowed to walk without any support, which he did remarkably well.

The case was brought to my clinic for operation to restore union between the extensor muscles and the patella, as they were apparently separated about four inches. The man could not extend his leg when the thigh was fixed and thus demonstrated that the function of the quadriceps extensor femoris was destroyed so far as the leg is concerned. But he could walk well, having learned to throw his leg with his thigh so that there was scarcely a fault noticed in his step. He carried a cane because he felt safer walking with it and had never fallen because of any weakness in the injured limb. I refused to operate as I did not think a union of tendons and patella would enable him to walk any better than he is walking now.—The Physician and Surgeon.

Do not forget that it is a good practice, in severe cases of fractured ribs, and those in which the lung is wounded, to strap the chest and apply ice externally. But do not strap or bandage if there is much surgical emphysema.—Fenwick.

Do not be very solicitous in obtaining crepitus of a fractured rib. Treat it as such. In manipulating either side of the fractured rib to obtain evidence of undue mobility, do not handle portions of two different ribs.—Fenwick.

Personal.

Dr. Joshua Chipwood has been appointed surgeon for the L. E. & W. Railroad at Connorsville, Ind.

Dr. Stewart L. McCurdy, formerly of Dennison, Ohio, and now located at Pittsburg, has been appointed surgeon for the Panhandle Railway.

Dr. Thomas Ross of Sacramento has succeeded Dr. Huntington as chief surgeon of the Southern Pacific Hospital at Sacramento.

Dr. J. H. Ford of Wabash, ex-president of the Indiana State Medical Society and surgeon for the Big Four Railroad Company, has recently accepted the position of chief surgeon of the entire system of the Big Four Railroad Company, and surgeon in charge of the company's general hospitals at Indianapolis. Dr. Ford was led to accept the position through the exceptional advantages offered as surgeon in charge of the main hospitals, and the munificent salary which the position affords. The Doctor will now have an opportunity to gratify a long felt desire to confine himself almost exclusively to surgery, the duties of the position affording ample and unusual opportunities along this line. The acceptance of this position makes it necessary for Dr. Ford to take up his residence in Indianapolis, and he is at the present time closing his business affairs in his old home at Wabash for this purpose.—Ft. Wayne Med. Journal.

Railway Miscellany.

The Railway as a Moral Agent.

The Florence (Kansas) Bulletin asks:

Why is a railroad or any other corporation habitually abused? The conduct of the average corporation is better than the conduct of the average citizen. Take the Santa Fe as an illustration. It is a great moralizer and temperance worker. The Santa Fe a couple of years ago decided that a dead beat could not remain in their employ. This rule does lots of good. It makes the employes "good pay" and gets them in the habit of saving their earnings. In this respect we want to offer the opinion that the dead beat reaches the deplorable stage by degrees. He is careless and profligate, spends money freely, runs in debt, lives beyond his income, gets used to duns, becomes indifferent and doesn't care whether he pays or not. Another rule of the Santa Fe is that employes must either quit the road or quit intoxicants. And this one rule has done more for the cause of temperance than the temperance societies will in a hundred years. Twenty-five years ago a man was regarded as unfit for railroad material in the West unless he was tough, profane and a toper. The opposite is true now. If individual employers did as much to promote temperance as the railroads do, drunkenness would soon be but a memory. And still another thing, railroad companies are liberal. No one questions the proposition that they could get cheaper help. Railroad companies are run on a generous plan. The extend better treatment than they receive. But every Digger Indian white man, every human snide, every political dyspeptic, and every ugly ulcer in the whole country has it in for the railroads.

The Ordinary Sleepers.

The Railway Age has more than once called attention to the possibilities of the second-class or "ordinary" sleeping car. Cars of this general type have been in use for many years, firstly as "immigrant" and then as "tourist" cars; though it is not necessary to say that in their most improved and modern form they differ very widely from the early immigrant cars. During the last two years their use has been considerably extended, though still confined almost exclusively to service on trans-continental lines and differing, as the cars now do, from first-class sleepers in little or nothing except the purely decorative features of internal adornment, they have appealed to a large class of what are ordinarily called "first-class" travelers. The charges have been materially less than those on the first-class sleepers, while the accommodations and comfort in all essential particulars have been practically the same, and it is not surprising that they have been popular.

The adoption of cars in this type on the trains of the Baltimore & Ohio making the night run between Chicago and Pittsburg, and between Baltimore and Newark, brings them into a new class of service—a class of service for which The Railway Age has on former occasions recommended them, and in which we believe that they have a large and useful part to play. The necessity of limiting the weight of high-speed passenger trains and the undesirability of doing anything which will increase the expense of that already too expensive service are serious objections to the introduction of second-class sleepers on many trains. But there are also strong arguments in their favor. On some runs their introduction would not necessitate the addition of an extra car, as they would replace one of the two or more day coaches now carried; and in such cases the extra weight would not be considerable. Nor is a combination day coach

and second-class sleeper impracticable. On all night runs at present there are passengers carried in day coaches who would gladly pay the small extra charge for accommodation in these cars, while either for financial reasons or because they feel out of place amid the too sumptuous surroundings, they will not go into the regular sleeping car. To furnish accommodations for these at a profit ought to be practicable.

There is in addition the important matter of the agitation for a reduction of existing sleeping car rates. These rates are not too high for the service now rendered. But the agitation continues and grows in strength. The second-class sleeper would furnish cheaper accommodations for many of those who now pay under protest the first-class rates, as well as for many who will not pay those rates, but are discontented at having to travel in day coaches. By so doing it would rob the agitation of much of its force. The existence of an "ordinary" (and avowedly moderate) sleeping car rate would necessarily make criticism of a higher rate for the first-class car more difficult.

We are well aware that there are many objections—some real and some imaginary—to the general adoption of the second-class sleeper, but we believe that their use will become general, none the less, and that in the not very distant future.

English Railway Accidents.

During last year the number of passengers killed in train accidents in England was eighteen, which is a large increase on the numbers for the two previous years, in both of which the number was only five, says the London Telegraph. Of these ten were killed in an accident at Welshampton, on the Cambrian Railway, and three in an accident at Rothbury, on the North British. Both of these accidents were caused by trains leaving the rails. On the other hand, the number of injured in train accidents was 324, as against 388 in the previous year.

The total number of accidents to passengers from causes other than accidents to trains reported in 1897 was 115 killed and 1,315 injured, as against 88 killed and 1,198 injured in 1896. When all classes of accident on railways are taken into account, however, only one passenger is killed in 7,747,520 passenger journeys, and only one in 628,688 is injured. Season ticket holders' journeys are not included in these figures, because the number of them cannot be estimated.

Unfortunately, the number of railway servants killed (510) and injured (4,129) during shunting operations continue to be large, and steps are being taken to ascertain whether there is anything in the practice adopted on Canadian and American railway systems with regard to the control of shunting operations which could usefully and properly be adapted to the requirements of the United Kingdom.

A Wabash Wreck Train Record.

Mr. W. A. Garrett, general superintendent of the Wabash Railroad at Decatur, Ill., sends us the accompanying record of quick work in sending out a wreck train and a copy of the instructions indicating the thoroughness of the system of organization by which it was made possible. The sending out of a wreck train completely equipped with men and supplies in seven minutes after the dispatcher was notified of the accident is a feat clearly deserving of the complimentary bulletin subsequently issued. The instructions governing the wreck crew at Forrest are covered in the following general notice issued March 28, 1898, at the time the wrecking service was reorganized:

With view of improving the wreck train movement, to clear main line, following instructions will govern the Forrest handling:

Dispatcher notify shop. Wreck whistle sounded, full blast, five minutes.

Wreckers and section men must report at train at dispatchers' office, after sounding of wreck whistle.

Call boy must carry in possession at all times a list of crews in charge of the several caboose cars, with their correct address, and immediately call most available conductor and brakeman. (Use yard switchmen for flagmen, if necessary.)

Shop foreman must keep at all times in his possession a list of crews in charge of the several engines, with correct address, and send two shop men out to call most available engineer and fireman.

Enginemen and trainmen reporting without being called, and used to run wreck train, will receive proper credit in record book.

Yard crew must bring wreck train in front of dispatchers' office, and attach caboose. If main line through yard is clear, yard crew are available callers after wreck train made ready.

Shop foreman must personally see that road engine is promptly attached to wreck train, that engine has necessary supplies, is properly oiled, and ready for the trip, enabling road crew to start the moment they report for duty and receive orders.

The wreck train, to clear main line, must have right of track over all trains.

Call the following officials: Trainmaster, chief dispatcher, general foreman, division roadmaster and relief dispatcher. Wire master mechanic if engine in trouble. Call Dr. Whitmire and other surgeons if personal in-

jury. Send AX report promptly to superintendent.

Wreck trains must stand first out on wrecking track; in other words, no cars left between the switch and wrecking outfit, under any conditions.

On each and every Saturday morning wrecking train must have following attention: Attach engine, test air brakes and inspect couplings; examine and see that journal boxes are in proper condition; examine and know that all rigging, blocks and other material and supplies are in working order, and test all jacks.

Wreck train foreman will keep record of time arrival each man at car, and, before leaving Forrest, send list to dispatchers' office, and chief dispatcher will compile following time figures and wire superintendent as soon as train departs:

A. Wreck occurred.
B. Dispatcher notified.
C. Shop notified.
D. Wreck whistle sounded.
F. Wreck train placed.
G. Caboose attached.
H. Road engine attached.
J. Conductor arrived.
K. Engineer arrived.
M. Fireman arrived.
N. Last wrecker arrived.
Q. Last section man arrived.
R. Orders complete.
S. Train left Forrest.

All employes will be held to strict accountability for delaying wreck train movements.

W. A. GARRETT, Superintendent.

The following is a copy of an advisory bulletin posted January 28, 1899, containing the record of one movement under the foregoing instructions:

Below please find record of the best wreck train movement on the middle division to date.

One mile south of Wing, freight train pulled out drawbar; dropped on track, causing derailment. Accident occurred January 25, 1899, at 7:25 a. m.

Dispatcher notified	7:42 a. m.
Shop notified	7:44 a. m.
Wreck train placed	7:47 a. m.
Engineer arrived	7:47 a. m.
Fireman arrived	7:47 a. m.
Road engine attached	7:48 a. m.
Conductor arrived	7:48 a. m.
Last section man arrived	7:48 a. m.
Last wrecker arrived	7:48 a. m.
Orders complete	7:47 a. m.
Wreck train left	7:49 a. m.

Average running time going to wreck, 40 miles per hour.

Yard foreman Frank Kruger ran the train and brakeman J. P. Carpenter flagged, with engineer W. S. Field and fireman A. Smith. Conductors W. Myers and J. D. Folwell reported, at 7:46 and 7:47 respectively, but were not used. General Foreman Bewley and Roadmaster McKeown accompanied the train.

Emergency movement of this kind reflects credit on organization and the efforts of all employes.

It might be added that prompt and full recognition of good work solidifies the organization and insures the exertion of the best efforts of the individuals composing it.

The Railroads of Cuba.

J. U. Crawford, engineer of branch lines of the Pennsylvania Railroad, who recently returned from Cuba, says of the railroads of that country:

"The principal railroads in Cuba aggregate about 1,100 miles in length, which mileage is divided among twelve companies. There are also a great many narrow-gauge roads and short-spur lines connected with and owned by the large plantations. Upward of 120 plantations in Cuba are said to have operated their own railroads, of all styles and gauges, from 4 feet 8½ inches down to 20 inches. The principal railroads running out of Havana are the United Railway and the Western Railway, the former being the largest system in the island. There are also two smaller railroads running to Marianao and Guanabacoa, which are simply suburban railroads. A small independent line also runs to the Regla terminus and large sugar warehouses, but it is operated as a part of the United Railway. The United Railway also connects and and intersects several other railroad companies, averaging from 70 to 100 miles in length, reaching the towns of Cardenas, Sagua, Caibarien, Santa Clara and Cienfuegos, while the Western Railway extends to Pinar del Rio. These several railroads, with their branches and connections, comprise what may rightfully be called the Havana system of railroads."

Of the various industrial consolidations which have been projected or perfected during the last few months, none has a more direct interest for railway men than the great car building combination which is now about accomplished, under the name of the American Car & Foundry Company. The combination includes the Michigan-Peninsular Car Company, the Jackson & Woodin Company, the Missouri Car & Foundry Company, the Ohio Falls Car Manufacturing Company, the Union Car Company, the St. Charles Car Company, the Wells & French Company and the Terre Haute Car & Manufacturing Company. This is a formidable list. It does not include all

the car building plants in the United States, there being at least three companies of the first class, as well as some minor organizations, and others devoted more particularly to the building of electric and street cars, which are not included. With some of the companies which are not actually parties to the consolidation, however, we are informed that a friendly understanding has been reached, and an agreement made for future relations. For the interests of the railway companies, it is, perhaps, as well that the new company will not constitute a monopoly, but will still be subject to sufficient outside competition. From the point of view of those interested in the constituent companies, the combination is comprehensive enough to insure the attainment of those economies which form the chief basis and justification of such an organization. Unquestionably, the eight companies operated in unison can conduct their business at less proportionate cost than would be possible under individual competitive conditions. The estimate of the promoters is that, if the combined plants can, during the year, be worked to 70 per cent of their full capacity, the annual net profit should amount to over $4,000,000. The sum of $2,100,000 will be needed to pay 7 per cent on the $30,000,000 of preferred stock. The estimated net earnings, if realized, would therefore leave 6 per cent for the common stock, of which the amount is also $30,000,000. That the properties justify the capitalization and the estimates of the promoters appears to be the opinion of those best competent to form an opinion, and it is understood that the one-half of the stock (both common and preferred) which has been offered to the public has been immediately largely over-subscribed.

It is practically settled that the place of holding the conventions of the Master Car Builders' and Master Mechanics' associations this year will be Old Point Comfort. The matter of final determination of the location was left by the joint executive committee of the two associations to a sub-committee consisting of Messrs. Mendenhall and McConnell, with the assistance of Mr. Henry, of the supply men's organization. The sub-committee took into full consideration the preference of the full committee, which had been expressed in favor of Atlantic City, but after a careful investigation determined that the scattering of the membership among the numerous hotels, which would be necessary at that place, together with other disadvantages, would be unsatisfactory to the members at large. The second choice of the full committee was Old Point Comfort, and it may be considered as assured that the Master Car Builders' Association will convene at the Hotel Chamberlin on June 14, and the Master Mechanics' Association on the following Monday, June 19, and official information confirmatory of this will probably be issued in a few days. We believe that this conclusion will be eminently satisfactory to the attendants at the conventions in general. The convention of 1897, which was held at Old Point Comfort, was excellently accommodated and most successful from all points of view. We understand that arrangements have been made and agreements reached which will obviate the few minor causes of complaint which arose at that meeting, and with the increased prosperity of the railway companies (as well as the happy condition of the supply trade in general), nothing now stands in the way of most successful meetings for 1899. And, as usual, the most triumphant feature of the meetings will be The Daily Railway Age.

A decision sustaining the legality of the so-called "blacklist" against railway employes was rendered by Judge Evans at Columbus, Ohio, February 22. A brakeman in the employ of the Pennsylvania lines was discharged on account of a freight wreck, for which he claimed he was not responsible. The company refused to give him clearance papers, by reason of which he claimed that he was unable to secure employment on any other road. He alleged that all the trunk lines are in a combination, and pledged not to employ any railroad man unless he has a clearance. The company filed a demurrer to the petition, which was sustained by Judge Evans, and the suit was dismissed. The court held that if, as the plaintiff alleged, the company discharged him on account of the accident, it evidently had reasonable grounds for so doing. It was the duty of the company to take action of this nature. As the plaintiff had not alleged that the discharge was malicious, he could not maintain any action in court.

The Burlington road each year sends out something like 50,000 large wall maps of the United States with the lines of the road shown in display. That these are popular is evidenced by the letter recently received by the passenger department from a convict in the penitentiary at Deer Lodge, Mont. It reads as follows: "I am in the Montana state prison, serving a long term. I have no friends, nor any money, so am very lonely in my prison cell. What I want to ask you is, will you please send me a hanger of the United States? I believe you call it the commercial map of the United States. If you will, I can pass a good many months looking it over, which will pass my time away. If you cannot do it, please let me know so I will know that you got this letter."

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THE TREATMENT OF FRACTURES WITHOUT IMMOBILIZATION.*

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I am just now entering upon my fifth decade as a practitioner of medicine, and as I look back over my life's work, now fast drawing to a close, a feeling of disappointment with myself is the dominant sentiment that fills my breast. In the domain of medicine proper, I am often puzzled to decide whether I have benefited my kind more than I have injured them, and as I review my work I am at a loss to tell whether I shall find anything to my credit when the great ledger that keeps an account of our doings on earth shall have been balanced up.

In the practice of surgery, however, one ought to be able to judge more accurately as to the result of his labors, and so looking back at the amount of disappointing work I have done in the treatment of fractures, especially during the earlier years of my professional career, my mind is filled with many a sad regret. It is true, that in all these years, I never had a suit for malpractice brought against me, which I attribute more to my skillful management than to my skill as a surgeon. My want of success in this branch of surgery, though as good as that of my average neighbor, was one of the most unsatisfactory parts of my earlier professional experience.

I had been taught by some of the best men on the continent, whose teachings were all after one line of thought, and that was: Adjust the fragments of the broken bone as accurately as possible, then put on your fixation appliance, leaving them undisturbed until complete union of the parts occurred. In other words, set your broken limb, put on your splints, and leave the rest to the reparative processes of nature. To fortify myself more thoroughly, I spent the larger part of a month's income for a complete set of Day's splints. I treated my cases upon the false theory that the least disturbance of the parts at the line of fracture was likely to be followed by the non-union of the broken bone. To my classical Day splints and this false idea as to the necessity of immobilizing every fractured bone, I attribute much of my lack of success in the treatment of my earlier cases.

At Bellevue, Prof. Hamilton taught me that for the healing of the broken bone in the chicken, immobilization was not at all necessary, yet one is astonished that in his classical work on "Fractures and Dislocations," he never seems to have utilized this important surgical truth. A decade ago, I saw published in the "Journal de Medicine et de Chirurgie Pratiques," some of the experiments made by the celebrated veterinarian, M. Cany, which proved that in the dog, when fractures were treated by complete immobilization, the results were never satisfactory; but when, on the contrary, the animal was simply confined to his kennel, and no fixation appliances were used, the results were more satisfactory. I think I will voice the sentiment of all who listen to me when I say it is often impossible to diagnose the exact nature of a fracture at your first visit, on account of the swelling and effusion of blood in and around the two ends of the fractured bone. In fact, in the case of the elbow-joint, especially, it is often not possible to diagnose with any approach to accuracy what your lesion really is, if called to the case some hours after the accident has occurred.

These teachings having divested my mind of the idea that any movement of the parts, if gently and intelligently done, was detrimental to the healing processes in fractures, I threw away my Day's splints, and in their place devised a simple loose fitting appliance, adapted

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to each particular case, removing and readjusting this dressing two or three times a week, if necessary, at the same time gently massaging the parts as the swelling and tumefaction disappeared, correcting any deformity that might have been overlooked at the first dressing. By thus carefully watching my cases, I have often as late as the third week changed and readjusted the position of the two ends of the fractured bone, and that, too, without in any way interfering with the processes of repair. By thus gently manipulating the parts, using at the same time gentle massage, a healthy provisional callus is thrown out, the union of the parts is firm, and the false joint is much less liable to occur as a complication.

For instance, the fracture which always heals, and in which you never hear of a false joint, is a fractured rib, and although in this fracture no very great displacement is likely to occur, perfect immobilization is never possible. In adopting this mode of treatment, one not only massages the seat of the fracture, but at the same time you bring into functional activity all the joints and tendons of the member that is broken. Thus, if your fracture be situated in any part of the arm, you manipulate the shoulder, elbow, wrist and the finger-joints in such a manner that when the fracture has healed the limb you have treated resumes at once all its healthy functions.

How often I remember having treated a fracture in the vicinity of the knee-joint, and after the lesion had entirely and satisfactorily healed, had on my hands a partially anchylosed joint, that took me careful watching and diligent treatment for the next six months to remedy. It was not, however, until I had followed the clinics of M. Lucas Championnière at the Beaujon Hospital in Paris that I was able to appreciate the extent to which mobilization could be successfully carried out in the treatment of fractures. Even in treatment of fractures of the long bones, he immobilizes the parts imperfectly, and only for a short time, and while the profession are slow to adopt his plan of treatment, I believe that his name will be immortalized for what he has done in this branch of surgery. Not that I would carry the mobilization of fractures to the extent that he does, for he, like most great men who have made an innovation in any department of science, is an enthusiast, and in my opinion carries a good practice beyond the limits that sound judgment will dictate.

In a no considerable observation of the work and teachings of our best men in both medicine and surgery, I find the tendency among a vast majority of them is to run in a rut, and be governed too often by the narrow bounds of a besetting hobby. While Championnière's hobby is to mobilize nearly all fractures, the hobby that represents the opposite side of this question I saw illustrated in an editorial in a late number of the Railway Surgeon, in which the writer brushed aside the whole question of treatment of fractures without immobilization, as a crazy fad, scarcely worth the consideration of the intelligent and level-headed reader. It was reading that article that determined me to write this paper.

Though not pertaining to the subject under consideration, I found another man in Paris with a hobby that interested me much, and that was in the person of M. Reclus of the Lænnec. His hobby was that in railway injuries of whatever character, you should never under any circumstances do a primary amputation. I saw a great deal of his work, which consisted in the perfect sterilization of the parts injured, putting on an aseptic dressing, and allowing this dressing to remain in situ for from ten to twenty days, during which time nature would have formed a line of demarkation between the dead and live parts, and at the end of this time you could do your amputation at this line. After my experience in following M. Reclus, I am well satisfied if I had followed his practice in some of my railway injuries, at least with those of the hand and foot, that I would often have given my patients better and more useful ilmbs.

Returning again to M. Championnière, whose work I followed for a considerable time, I have drawn the following conclusions as to its adaptability in the general management of fractures:

First.—When the fracture occurs in the vicinity of a joint, and where the tendency to displacement of the fragments is slight, and where in the treatment of the case our greatest care should be to retain the functional integrity of the joint itself, I believe all fractures of this character should be treated without any attempt at the immobilization of the parts.

Second.—Fractures involving articular sur-

faces of the elbow-joint, should, in my opinion, never be placed in a fixation apparatus. Put the arm at the first in position at a right angle, put on a moderately fitting bandage, and within three or four days begin the motion of the parts, accompanied at the same time with an intelligent application of massage.

Third.—I believe that Championnière's treatment without immobilization is best adapted for the management of those cases of fracture of the clavicle where you are not required to unite the ends of the bone by silver wires. The appliances for the treatment of this fracture are nearly as diversified as the pessaries upon the market for the correction of the various displacements of the womb.

I was a student and an admirer of the elder Sayre, and his classical apparatus for the treatment of this lesion was my last effort in the direction of putting on an immobilized apparatus for the treatment of this injury. It is true if the dressing be well put on, and frequently reapplied, it will retain the ends of the bone approximately in the position they should be, but the whole complicated affair when thus well applied is such a course of torture and discomfort to the patient that very few of them allow you to keep it applied perfectly, and if imperfectly applied it is of little or no utility. For my part, I would rather have a fracture of the clavicle and carry my arm in a sling until the parts healed, than to wear a Sayre appliance for a period of three weeks. Not only is there great discomfort on account of the position in which the arm must be held, but the plasters that are used for this purpose often excoriate the skin, and set up an artificial eczema that torments the patient beyond measure.

Long before I had seen any of the work of Championniére, I treated fractures of the clavicle by simply placing a smooth cotton pad in the axilla, carrying a bandage around the body, so as to include the arm just above the elbow-joint, placing the arm at the same time in a sling. With this manner of treatment I have found my results generally as good as when I treated my patients with the Sayre dressing. It is true there is always more or less deformity after this or any other mode of treatment, but this deformity is usually only temporary in character, and as far as the functional integrity of the arm is concerned, your results are usually entirely satisfactory. Seeing M. Championnére's manner of treating this fracture with his intelligent massage, I believe I should be able to get in the future as good results as can be obtained with any immobilizing appliances, and give my patients vastly less discomfort during the period of treatment.

But of all the fractures of the body, I especially insist that the Colles' fracture should never be put in any kind of an immobilizing apparatus. The majority of your patients are women past middle life, their muscles have already undergone a condition of partial senile atrophy, and all that is necessary is to bind these muscles down tight to the osseous structures, by putting on splints and bandages, and in a few weeks you have a set of muscles that have lost their integrity to an extent that hinders for all future time their perfect function. I have seen dozens of these fractures treated by M. Championnére with results that were so far superior to what I have been able to achieve with my numerous fixation splints that I would now no more think of putting on one of these than I would of amputating my patient's forearm. My plan of treatment is to simply tie a common roller bandage around the arm just above the wrist-joint, put on no other dressing, but have the patient visit me at least once in twenty-four hours, and spend ten minutes in intelligent massage of all the parts, from the finger tips to the elbow-joint. If there be a great deal of contusion about the wrist-joint in connection with this fracture, I do not commence the active movements of the parts for the first three or four days, but after that period I move the joint freely, without giving my patient the least discomfort. I do not claim that it is always possible to treat the Colles' fracture without there being a slight deformity, but I do claim that such deformity is less in the manner of treatment of which I have spoken than it is in a fixation apparatus, and that the functions of the joint can be re-established perfectly, or nearly so in every case, a result that I am very certain does not always follow when immobilizing splints are used in its treatment.

The subject of which I have spoken in this paper is an exhaustive one, and, of course, I have only been able to touch in the most

cursory manner a very few points that I might have discussed. I hope, however, I shall be able to learn more from its discussion than I now know. If, however, I shall be able to induce a single surgeon who listens to me to abandon, and that forever, all forms of fixation apparatus in the treatment of Colles' fracture, I believe I will have accomplished some good to the poor, and often in after life, half-crippled victim of this very frequent lesion.

DISCUSSION.

Dr. H. M. Brown: If Dr. Caldwell had brought a paper of this kind before an audience of surgeons twenty years ago he might have run the risk of being accused of surgical anarchy, but in these days I think it will not only meet with the approval of the majority of the gentlemen who have heard it, but the paper will have served to draw the attention of the members towards some facts in regard to the history of medicine in relation to the treatment of fractures that are in themselves extremely interesting. It has been my personal fortune to have been located among a number of different tribes of wild and half-wild peoples in the course of my life, and even in the course of my medical life, and I am prepared to say that the treatment of any form of fracture among the Arabs by splints is absolutely unknown. Fractures, particularly in the neighborhood of the joints, are treated by massage, by skillful manipulations, and by the simplest dressings. Among the Hindus in Honduras, a primitive people living in the Deep Valley, fractures are treated always by the skilled medicine man by manipulation only. Among the Caliphs on the coast of Central America, who are descended from the old African tribes, who originally drifted across to this country in their canoes, fractures, sprains and injuries about the joints are handled almost entirely by means of manipulation and massage.

In this country we have courts and lawyers who send their "heelers" to see every individual who is injured in a railroad accident to find some sort of means by which the injured individual can be persuaded to bring suit for damages. The lawyer, too, shares in the profits. We also have the misfortune to have had handed down to us through many generations the notion that bones must be set; we know bones are never set. A bone-setter brings the limb in as nearly normal position as it was before the fracture or injury; we do not know whether there are fragments of muscles interposed between the bone ends or not; we hope there are not: Just because we have courts and lawyers and bones must be set, we are handicapped. We are looked to by the public to set a fractured bone, and if it is not properly done, the case comes before some pettifogging lawyer who seeks to get two thousand dollars or more out of the railroad company. We have to think of these things not only in fractures with immobilization, but also in fractures that can be treated without immobilization. We have an area in all the bones, as the humerus, tibia and fibula, where non-union is most likely to take place; in other words, there are non-union points. With this staring us in the face, are there not many cases in which we are forced, through the ignorance of the public, to use splints, to use immobilization, and get a result, if possible? Have we not gone far enough in the evolution of the public mind to enable us to do many things that our common sense teaches us should not be done? It would be far better to follow the advice of Dr. Caldwell and use no splints; but we have the eternal pressure of tradition, the eternal weight of ignorance, the stupidity of jurors, and the cussedness of lawyers to contend with, and we cannot avoid using splints very often when we would do otherwise.

Dr. J. W. Kester: I am not prepared to concede that fractures in general or fractures of all kinds should be treated without immobilization. So far as a Colles' fracture is concerned, I should be afraid to treat it without immobilization. I am in the habit of treating a Colles' fracture with a perforated splint with drop wrist to overcome the deformity, and the results bear me out. On the other hand, I do not think it is out of place for me to mention a case in which a would-be surgeon tried to do what he did not do, and nature did the rest. Some time between Christmas and New Year's of last year I was called to see a man who had fallen on a sidewalk, fracturing the tibia at the lower third, and the fibula at the upper third. This man was a chronic drinker; when found, he was down in the ditch; it was cold weather, and he laid there from eleven o'clock until half-past

one before he was found. He was carried to his house a short distance, and after a careful examination, I found the fractures I have spoken of. I straightened the limb as well as I could, placed it in a blanket splint, tied it with a couple of bandages around the foot and above the knee, and left him that way. About nine o'clock the next morning, after giving him a good dose of morphine, I got him quiet. The following morning he was very noisy. He rolled over in his bed and his knee with broken leg was up under his chin. I straightened the leg again, put it in a fracture-box with two bags of sand on either side, and left him. Ten days later I applied a plaster cast from the toes half way up the thigh, leaving him that way for six weeks, at the end of which time I cut through the cast and found we had just as much crepitation as we had to start with. I readjusted the cast, and tied up the leg so that he could get a little motion by swinging in bed. I applied a similar cast, left him four weeks longer, and at the end of that time I removed the cast entirely, finding that there was cartilaginous union. I applied a perforated splint, tucked under the whole back of the leg; another splint in front, bound it from the foot to the ankle over the joint and up the knee with rubber bandage, taking off the bandage and reapplying it daily, letting him walk on crutches. At this time no deformity was apparent; we could not feel the line where union ought to be; he now has just as good a leg as he ever did.

Dr. A. B. Poore: If Dr. Caldwell explained his method of massage of broken bones, I failed to hear it. I do not quite understand what he means by "massage of a broken bone," and personally I would like to have him explain it a little more fully. For instance, suppose he had a fracture of both bones of the leg with deformity, what does he mean by immobilization in a case of that kind, and also what he means by massage? Then, too, I would like to ask him what he means by a fracture of the femur either within or without the capsule.

Dr. W. S. Caldwell: In my paper I did not explain sufficiently the technique of massage. I presume the gentleman refers to fractures of large bones.

Dr. Poore: You made the statement generally regarding these fractures.

Dr. Caldwell: I said distinctly that Championniere treats his fractures without any kind of splint or fixation apparatus. I said he went too far in so doing. For instance, in a fracture of the femur he puts on an extension apparatus, but not so very heavy. Instead of twenty pounds he would supply five, and he simply takes and massages the part from below up, and in that way he claims he gets more healthy, more perfect provisional callus. Swelling goes down more rapidly and healing takes place in two-thirds of the usual time. I do not wish to be understood as advocating this plan of treatment as a universal application in fractures of the femur. I would not treat them with the same kind of appliance myself. But what I say is, I would take off the appliance every day and use intelligent massage from below up, spending about ten minutes during each sitting. This kind of massage does the patient much good by removing the effused blood and hastening the process of repair.

Dr. Poore: With reference to Championnière, is it not true that there are many noted surgeons in Paris who are much opposed to his treatment of fractures? Is it not true that in Championnière's treatment of fractures he immobilizes the patient and does not move the bone?

Dr. Caldwell: That is true, he has an assistant who holds the bone. The assistant gives the massage above the fracture. He does not produce very much motion between the parts. As the gentleman says, a large number of surgeons in Paris oppose his methods of treatment of fractures. But, gentlemen, we have not arrived at perfection in the treatment of fractures. Let us take, for instance, carbolic acid and bichloride of mercury and their use. We could discuss this subject all day.

Dr. John Binnie: It seems to me we are treading now on dangerous ground. We are making positive assertions. A great many things Dr. Caldwell has said I believe to be true. I have seen them work nicely. I would be afraid to have him as a witness against me on the witness stand if he spoke as positively as he does here. Some men can put on plaster-of-Paris bandages and get a good result occasionally; others will try it and fail. I consider myself somewhat of an expert, but I

cannot apply a plaster-of-Paris bandage on a recent fracture very well. I am leaning more and more toward the idea of applying loose dressings, removing them often, practicing massage, and in some cases it does nicely; in other cases it has bothered me. In a case of Colles' fracture I got along very well; the treatment only occupied about ten days; I took the splints off daily and the result was very good. One of my patients had stiff fingers because he kept the splints on five weeks after I told him to take them off.

In treating fractures we oftentimes apply bandages too tightly. A tight bandage will interfere with union, and I think sometimes it prevents it altogether. Then, too, we nearly always leave it on too long. These bandages should be removed quite often. It seems to me we should take a decided stand that we would not apply a dressing to this or that particular fracture, or we will put this particular fracture in this particular dressing. I think we want to be careful about establishing any such opinions. There is nothing that I know of connected with medicine that requires more judgment and greater care than the treatment of fractures. Our results from the treatment of Colles' fractures are not always uniform. We may treat a dozen cases and not get two of them exactly alike, although they are suitable for the same kind of treatment. Therefore, I should dislike to see the idea established here definitely for or against any given treatment, or that we must do this or that. We want to be careful. I don't want to see too positive grounds taken in regard to any one method.

Dr. A. L. Clark: If those gentlemen who are constantly having bad results in the treatment of Colles' fracture will observe the plan of treatment of taking a piece of shingle, cutting it the right width, applying one over the anterior and one over the posterior surface of the hand, giving the fingers free motion, having them wide enough so there will be a slight pressure on either side, and placing the arm at right angles in that position and keeping it there, they will never have a bad result. In this manner the bones are kept parallel and you cannot get a bad result. The bones are held in their natural position, being parallel with one another, and you are sure to have a good result.

Dr. Drake: I was a witness in court a short time ago in a case of non-union of fracture of the arm treated by immobilization. The man secured two thousand dollars against a physician. I have broken up two deformities through these fractures where the union was imperfect and treated it properly. What Dr. Clark said is correct. I cannot treat fractures without splints, or without some kind of a splint, and I treat fractures in such a way that I can examine the parts daily. I do not put up a fractured limb and leave it several weeks without examining it.

Dr. R. J. Coyne: It seems to me that while mobility or perfect freedom in a limb may be necessary in a case of Colles' fracture, I for one fail to see how we are going to treat the shaft of the femur, for instance, or the humerus in a case of oblique fracture with great deformity and shortening without immobilizing the limb to some extent. Now, it is recognized that in a case of shortening some method of extension is desirable, and the mode of extension you practice produces to a certain extent immobilization.

I recall the case of an engineer on the Milwaukee road who sustained a fracture of the humerus at about the upper third, and I supposed that I had secured immobilization. I put splints upon the arm, but it was pretty short. The upper fragment of the bone was a little short, and the pectoral muscle prevented me from getting my splints bandaged high enough up to perfectly immobilize the upper segment of the bone. I had his arm in a sling and kept it perfectly immobilized. But when he was down around town with his arm in a sling I asked him how his arm was getting along and he said, "All right." It did not hurt him to move it and he could with the action of the deltoid move the upper segment while the lower segment was immobilized. The result was, at the end of three months we had ligamentous union; a false joint formed. Now, I would like to know whether the immobilization of the arm with perfect freedom of the shoulder segment was the cause of my bad result. After watching the case for a reasonable time, thinking os-

seous union might take place, I operated and secured immobilization. After three months I cut down on the fracture, cut away the false membrane that had formed between the bone fragments, drilled into the bones, brought the ends together with silver sutures, and perfectly immobilized the bone, and in six weeks from that time he was able to pull the throttle with the left hand as usual.

In a case of oblique fracture it seems to me immobilization is necessary. I am in the habit of treating fractures with very little discomfort to the patient. I seldom or never put a permanent dressing on a fracture until after the swelling has disappeared, and then I use either a plaster-of-Paris dressing or silicate of soda. I never have had a bad result. I allow the patient to go about the room after ten days with the dressing that I apply, on crutches.

I recall the case of a man in my town who was down town every day at the end of three weeks. He had broken both bones of his leg. There was very little shortening. I applied a plaster-of-Paris dressing and at the end of ten days he was able to sit with his foot up on a chair in front of him. He moved around the house comfortably on crutches and in three weeks he was down town in his buggy.

Every case is a law unto itself, and I would not treat every case on the immobilization plan, nor would I apply loose dressings. If I had a case that could be treated properly without splints, I should certainly treat it that way. But I am opposed to putting a patient to bed and keeping him six weeks on his back with a sixteen-pound weight hanging over the foot of the bed for the purpose of making extension. I am able to produce extension by a plaster-of-Paris cast or a Belgian bandage. I should like to hear what Dr. Caldwell has to say about oblique fracture of the femur and his plan of treatment with massage.

Dr. A. I. Bouffleur: I would like to call attention to one or two points in this discussion, and possibly take issue with Dr. Brown as to allowing tradition to rule our actions. There is no question but that to a certain extent it does so, but that is no reason why we should not override tradition as quickly as possible. There was a time, even since I have been in practice, when, if one was called to a case of crushing injury and did not amputate immediately, he would be censured by the people of the community. That is not the case now. It is a remnant of tradition. We have overridden that tradition. We can do the same with regard to the application of splints. Any sensible man will admit that there is necessity for more than massage in the treatment of the fractures under discussion. I know that Dr. Caldwell, as he has already intimated, does not treat a fracture of the thigh by simply allowing the man to lie in bed and massaging him every day, because there are other elements concerned in the treatment of fracture than massage. His idea of treatment without immobilization does not include, as I take it, the treatment, for instance, of delirium tremens with a broken bone. The Doctor in his paper used the expression "intelligent massage." This is a very politic term in one sense. However, I think it would be better for him to have gone a step further and stated "personal massage." The principle of massage is a simple matter as applied to fractures, and therefore the word "intelligent" means that the bone shall be maintained in position while you are making this massage, and it should be given light enough so as not to disturb the fragments. All of you, if you will think for a moment, will recall cases in which provisional callus is apparently firm within a few hours. It is a rapid formation in many instances, so that at the end of forty-eight hours displacement of the fragments is frequently likely to occur, and there is no tendency for it to occur. I am a firm believer in the use of massage, but I am not prepared to discard immobilizing apparatuses in every instance. I may say that I rarely ever treat a fracture without resorting more or less to massage, either with or without a splint. I believe that when we practice massage in cases of fracture, function is restored in much less time than if we allow the course of the union to go along unaided. In some fractures I have felt greater ease, even in Colles' fracture, when I have applied a splint for a few days, but always removing it and applying massage for a few moments daily, and after a few days

leaving the splints off. I have in mind at the present time some cases in which even Dr. Caldwell would not have allowed the limbs to have gone out without some support, because of the danger of the bandage getting loose all the time, although complete reduction was made; there would be deformity.

About ten years ago I heard a distinguished professor of surgery say that one of two things was a good result in Colles' fracture: Either a perfect limb, even though there was some limitation of motion; or perfect motion, even though there was deformity. At the present day it would seem as if we looked for perfect contour and a perfect result, both. We will not get it in every instance by any plan of treatment. It is therefore not prudent for us to say that because a man has a slight deformity about the wrist, the physician did not treat the case properly; because I do not care what plan of treatment it is, we will occasionally fail to get perfect contour and perfect motion. I take this position because I have occasion to see some of the limbs after you have treated them, and I know that in some cases that are supposed to be cured with perfect results, the limbs are not perfect in contour. The results, however, are good, and I so certify, but the contour of the limb is not always perfect. We must not expect too much by any plan of treatment.

I am more than glad to have heard this paper, because I know of no one who has had a more intimate relationship with the distinguished French surgeon, Lucas Championnière, than Dr. Caldwell; and I know of some other statements Championnière has made about disinfection which, as Dr. Caldwell has stated on previous occasions, are of marked practical value. He is an enthusiast in the treatment of fractures without immobilization. It is a valuable adjunct, and in some cases we can treat fractures without splints, while in others we can use massage as an adjunct to fixation treatment.

Dr. Caldwell (closing the discussion): If any of the gentlemen entertain the idea that I propose to treat all cases of fracture without fixation, it is erroneous. The first speaker maintained that we must pander to public sentiment. I do not believe we should; I object to that. For instance, in certain cases I am a great advocate of cold water. If a child had scarlatina or a certain form of lung trouble I might apply a cold pack. If the child died, I would do it just the same.

About twenty years ago I read a paper before the American Medical Association on intra-uterine therapeutics, and the late Dr. A. Reeves Jackson of this city said that such treatment as I had advocated would result in death of a large number of patients. Practitioners are now advocating the treatment I recommended at that time, although Dr. Jackson thought it was terrible. So the time is coming when the treatment that I have outlined will be almost universally practiced and physicians will wonder why they did not apply it sooner.

As to Dr. Clark's method of treating Colles' fracture, I have tried it, but have not obtained the same good results. When I hear men express themselves as being perfectly satisfied with their work, I begin to think that I am a regular old bungler. It is not because I have not tried to learn, for I have arisen early in the morning, have run through snow and wind to see eminent practitioners in Vienna and Paris do their work, and when I think of my work I am not satisfied with it. I envy the man who is perfectly satisfied with himself. My work is, after all, nearly done, and as I look back upon it I am greatly dissatisfied with it.

Indiana State Board of Health Regulations to Prevent Spitting Upon Sidewalks and Other Public Places.

Section 1.—Spitting upon sidewalks, floors of public buildings, halls, railway stations, stairways and public conveyances is frequently the means of communicating disease and is therefore a nuisance and is hereby forbidden.

Section 2.—Any person violating the above regulation shall be punished for committing a nuisance as provided by the statutes.

(a) Employes of railroads, factories, etc., are required to assist in the enforcement of these regulations.

It is requested that paragraph (a) be adopted and promulgated by railways, factories, etc.

Remember that in dislocation at the elbow the joint becomes rapidly irreducible. Never forget that faulty diagnosis may cause loss of motion in the joint.—Fenwick.

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THE SURGEON AS A SANITARIAN.

In another column of this issue will be found some matter on car sanitation from the Bulletin of the Indiana State Board of Health, which was kindly sent The Railway Surgeon by Dr. J. N. Hurty, the efficient secretary of the Board. After reading it one wonders if the members of the I. A. R. S. cannot do some missionary work as sanitarians during the intervals of attending to c. c. fractures, burns of the third degree, etc.

For instance, our associate, Dr. G. P. Conn of Concord, N. H., as president of the State Board of Health, made an inspection of the summer resorts of his state, the hotels at which, as he points out, are public buildings, and their inspection being properly part of the board's work. Indirectly such inspections, of course, benefit the railway companies. In his report Dr. Conn refers to the stations and grounds along the lines of the Maine Central and Boston & Maine railways, which he found in admirable condition, both from the standpoints of hygiene and picturesqueness. It is to be feared that these conditions are not to be found everywhere, and some of the smaller stations are stuffy and even noisome, especially in the toilet rooms.

As regards drinking water, the following from a late number of the Ohio Sanitary Bulletin, is timely:

"During the threatened cholera epidemic in 1892 we called attention to the dangerous method of icing railroad trains. The subject is brought up again, but nothing will be said about the danger of spreading disease in this manner, though the danger is not a fancied one.

"Our protest is now solely upon the grounds of common cleanliness and decency. When a train stops at an icing station a dirty fellow comes into the cars bearing a bucket containing pieces of ice. His hands are invariably black with dirt, picked up, who knows where? He removes the top of the ice-cooler, and with his dirty hands places in it a number of pieces of ice. On several occasions we have seen him plunge his hand into the water in the cooler in his efforts to force in the ice. This not only applies to the ordinary day coaches, but to the 'Pullmans.'

"Many of the cars have drinking water tanks which must be filled from the top. In that case two men bring the broken ice in a hand cart, which is usually the reverse of clean in appearance. One man gets on top of the car and the other one throws up to him pieces of ice, which he places in the water tank. In this case we have four dirty hands in contact with the ice. It is true that after their work is finished these hands present a much better appearance, but for our part we should perfer not to have them washed in the water we have to drink. With a little care, and with little or no expense, this disgustingly dirty, if not dangerous, method of icing railroad cars might be changed to a proper one."

This is not overdrawn, as many can testify. In addition the water tanks are often in unpleasant proximity to the closets.

Concerning the spitting nuisance, Dr. Hurty informs us that their regulations will be printed by the Wabash road and posted in station and passenger coach, and in the union station at Indianapolis. It is also to be sent

to all other roads in the state, and their co-operation in the anti-filth crusade is expected. "Our theory," he states, "is that oral excrement should be properly cared for." There is not the slightest doubt but that much can be done in this direction, especially by good examples set by the railway employes.

A few years ago the city of Chicago made an effort to stop the spitting nuisance by posting placards in street cars and public places, but it was noticed the employes themselves were among the chief offenders. A few arrests were made and the whole affair retired to that limbo, "unconstitutional." In this connection the writer has an amusing recollection of a street car ride with the ex-health officer of another city, who inveighed against the practice of covering the seats with carpet, all the while copiously expectorating tobacco juice over the floor!

Car sanitation to the extent advocated by the Board is probably ideal at present, as even Dr. Hurty acknowledges, and in any event is a topic for the consideration of chief or division surgeons. The ubiquitous "local" surgeon can, however, if properly encouraged and assisted, be of considerable utility, both to his company and to its patrons. Attention may be directed, in conclusion, to the article on thermostatic regulation of car heating, also to be found in another column, which seems to promise well.

Medico-Legal Notes.

Fright—No Liability for Injuries Occasioned Thereby.

Fright.—No recovery of damages for physical injuries resulting therefrom. There can be no recovery for bodily ailments resulting from fright where the fright was not accompanied by any immediate physical injury.

Adams, J.: This is an appeal from a judgment for $4,000 rendered in an action on the case for negligence in which appellee was a passenger on a car of the appellant, the motive power of which was electricity. The negligence charged and the alleged result thereof are thus stated in the declaration:

"As said car was turning a certain curve at or near the point where Ashland avenue is intersected and crossed by said Clybourn place, said car started forward with a sudden jerk, so that the pole aforesaid running from said overhead wire or trolley wire to the car became detached or loosened from its fastening and fell with great force and violence to and upon the roof of said car and bounded from hence to the ground, by means of which premises the plaintiff was then and there greatly frightened, terrified, stunned and shocked; and she became and was sick, sore, lame and disordered, and so remained for a long space of time, and will for all time, as a direct result of the said injuries so occasioned as aforesaid, remain sick, sore, lame and disordered," etc.

Appellee testified that she was frightened, but that nothing was the matter with her immediately after the accident, except that she was in a weak and nervous condition, but that, in about two weeks after the accident, she began to have headache and pains in her back. She describes other physical ailments occurring afterward, which she claims was the result of fright occasioned as alleged in her declaration. It is not claimed that the fright was accompanied by any physical injury, and the evidence is that it was not. The question presented, namely, whether there can be a recovery for mere fright unaccompanied with physical injury, but resulting finally in bodily ailments, is fully discussed in the recent case of Braun vs. Craven, 175 Ill., 401, and decided in the negative. That cases is decisive of this. The judgment will be reversed.

Master and Servant—Personal Injuy.—A judgment recovered by David L. McClintock against the C. C. C. & St. L. Railway Co. has been reversed by the U. S. Court of Appeals of the 7th circuit.

McClintock was injured while in the service as a brakeman. In his declaration he alleged that the company "did not keep its cars and machinery thereof in good repair, but on the contrary the couplers by which the cars are fastened together were out of repair and were not sufficient, and the defendant by the exercise of reasonable care could have known of said defect, and when the plaintiff, in the careful performance of his duty as brakeman, as aforesaid, in the yard of the defendant, with due care and without knowledge of the condition of the machinery, was caught by and in the machinery used for coupling the said cars together, because the said couplers and the pin so used to couple the said cars together were then out of repair, thereby injuring the plaintiff, and then and there with great force and violence the plaintiff's arm and hand were, by the said couplers and machinery, struck and mashed," and amputation made necessary. In reversing Judge Woods says:

"The court erred in its charge when, after

telling the jury that the railroad company in employing the plaintiff undertook to use ordinary diligence in providing said machinery and instrumentalities to be handled by its employes, it added, and the most efficient mode of discharging that duty in respect to cars used was to maintain a careful system of inspection, etc. The implication here is that the company was bound to adopt the most efficient mode of discharging a duty, a proposition which is inconsistent with the correct statement, which preceded, that the duty of the company was to use ordinary diligence. Besides, it was a question of fact what was the most efficient mode of discharging the supposed duty.

"There was further error in the charge in that the jury was instructed that the plaintiff might recover if he was injured in consequence of a defect in the pin or some apparatus provided for his use. He was entitled to recover only upon the ground alleged in the declaration. It is not clear that any ground is well alleged, but the question has not been raised by demurrer, motion in arrest or assignment of error, and will not be considered."—Chicago Law J.

The Supreme Court of New Jersey has rendered an opinion holding that a railroad company is liable for injuries to a passenger upon a station platform, even though such injuries were inflicted by persons not in the company's employ, where it is shown that the accident could have been prevented through the exercise of proper caution. Fanny P. Exton, who had just purchased a ticket over the Central of New Jersey and was going to the baggage room at the foot of Liberty street, New York, was knocked down and injured by two cabmen, who were engaged in a friendly scuffle. She sued the railroad and received a verdict for $500. The case was carried to the Supreme Court on appeal, and that tribunal sustained the verdict of the lower court, holding that the company had knowledge of the obstruction of the passageway to the baggage-room by the cabmen and should have kept it clear.—Railway Age.

Remember that the more a fracture approaches the punctured form the greater the need for the trephine. Do not forget the rule:

If the depression is slight,
If the extent is considerable,
If no symptoms are present,
leave it, or, vice versa, operate.—Fenwick.

Always avoid purgatives in treating a patient who has swallowed a foreign body. Give opium and constipating food—boiled eggs, cheese, puddings, potatoes, etc.—Fenwick.

Extracts and Abstracts.

Railway Sanitation.

At the last meeting of the American Public Health Association, held September 27, 28, 29 and 30, at Ottawa, Canada, railway sanitation caused much interest and discussion. The chairman of the committee on this subject, Prof. Woodbridge of Boston, presented a valuable paper on "Car Ventilation," accompanying the same with plans and specifications. His general report contained the following letter to the Indiana State Board of Health from the management of the Big Four Railway, the spirit and promises of which were strongly praised by the association:

BIG FOUR RAILWAY.
Office Superintendent of Motive Power, Indianapolis, Ind.

Indiana State Board of Health, Indianapolis, Ind.:

Gentlemen:—We acknowledge, with thanks, the receipt of your letter concerning car sanitation. Your suggestions as to car construction from the sanitary standpoint are ideal and certainly most excellent, but we believe you would agree with us that some points are quite impracticable. We earnestly assure you, however, that we intend from this time forth to make all our passenger equipment conform to all practical sanitary suggestions, and the old equipment will be remodeled to meet such requirements as it is presented to the shops for overhauling.

The construction of seats and backs which are removable so as to give opportunity for more thorough dusting and cleaning has been ordered. It will be further ordered that bevel edges and rounded corners shall hereafter prevail, and your suggestions for better ventilation and exclusion of dust and smoke will soon be submitted to practical experiment.

At the present time the interior arrangement of refrigerators in our dining and buffet cars meet your recommendations, for they are lined with porcelain covered metal and are cleaned and then disinfected with formaldehyde at the end of each run.

All drinking waters have during the past year been frequently submitted to sanitary analysis, and only such as were above suspicion supplied to passengers. In those cities where this company has its own terminals arrangements have been made to furnish distilled, aerated water for drinking purposes to all passenger cars.

Your suggestions concerning cleaning and disinfecting passenger coaches which were

adopted over one year ago have been faithfully followed and will be continued.

Very respectfully yours,
C., C., C. & St. L. R. R.,
By WM. GARSTANG,
Supt. Motive Power.

The sanitary circular of this board concerning railways is as follows:

Suggestions by the Indiana State Board of Health to Indiana Railways Concerning the Sanitary Condition and Sanitary Care of Passenger Coaches.

Construction.—The interior should meet the following requirements:

(a) Not easily made dirty; easily cleaned and kept clean.

(b) Equable warming, perfect ventilation with exclusion of smoke and dust.

Note.—It is impossible to perfectly attain all of these conditions, but they should be approached as near as possible.

To Secure (a).—Material composing interior should be hard wood, susceptible of polish and unabsorbent. No channeled or bead work or carving below the windows; window ledges rounded; windows to have curtains of smooth unabsorbent, flexible material, inside slatted blinds not allowed, as they have so many corners and cracks where dirt may accumulate and cannot be properly cleaned. Seats to be supported on the aisle by a plain, round iron post, painted with enamel paint; arm rests to be round or oval, without upholstering; plush not to be used for upholstering if any other more generally suitable material can be had, which is doubtful; bottoms and backs removable, and the backs upholstered only in the center, the edges being hard, varnished wood, or if completely upholstered, to be supplied with clean linen covers.

Closets to be floored with metalicized or filled wood, wainscoting the same, the latter being perfectly plain and smooth. Hopper should be a plain porcelain cone delivering all dejecta into a drawer containing dry, absorbent earth and supplied with a mechanical device, which would, by pulling a chain sprinkle dry, absorbent earth upon discharges; the drawer being emptied at terminals, cleaned, and two inches of absorbent earth placed in same before restoring to its place in the car. This would avoid distributing filth with its possible infection through the country.

The heating pipes should be covered with an enameled metal shield to prevent expectoration and dirt from falling upon them. No carpets or matting should be permitted in the aisle, but a strip of plain rubber floor covering is allowable.

To Secure (b). First, as to the principles of heating and ventilating: Heated air rises, and not until the upper part of an apartment is warm is it possible to warm the lower part. Vitiated air accumulates mostly below the breathing line. By the present method of warming and ventilating the warm air arises and is largely drawn out through the ventilators in the deck, thus wasting heat, and the lower vitiated air in the car is left to be swept out by draughts from the open door, or by reversed currents (draughts) through the deck ventilators. The present way of ventilating cars may rightly be called "The inefficient and injurious draught method."

The problem of equable warming and ventilating without draughts, dust and smoke may be in great part solved as follows:

Between each window and between the walls of the car place ducts leading from a register level with the floor out through the top of the car, providing movable hoods to the projecting ducts; or else lead the ducts into a pipe traversing the whole length of the car, providing this pipe with valves at each end, the front valve to be always closed. Into these ventilating ducts lead a branch from the heating pipes. This will warm the air in the duct, causing it to rise and draw out the bad air from near the floor, and at the same time draw down the warm air from the ceiling. As this method draws the bad air out, fresh air may be admitted through a few of the ventilating ducts, which are not provided with hot pipes and which contain loose cotton, which will strain out dust completely and smoke partially. Double doors should be provided even in vestibuled cars. The second or innermost door to be supplied with closing spring hinges, to contain a glass panel, swing both ways and stop the narrow passage between the closets and wash rooms, which are at both ends. If properly managed this arrangement will keep out draughts, dust and smoke when the outer vestibule door is opened at stations.

DRINKING WATER.

The drinking water should either be distilled or sterilized. Frequent analyses of the supply would be very well, but the only certain way of obtaining water above suspicion is to distill or sterilize it. Water tanks could be of metal and arranged as at present, but plain, porcelain tanks in full view would be far better. The drinking glass should be smooth and round-bottomed. For those who will not drink from a glass used by another without first washing the same, small paper cups might be furnished from a slot machine for a penny.

DINING CARS.

The principles (a) and (b) should be strictly followed in dining-car construction, and in addition the kitchen interior, the dish lockers and food boxes should be constructed with especial effort to avoid cracks and corners. Refrigerators and food boxes should be lined

with enamel, all wooden racks being carefully avoided.

CLEANING AND DISINFECTION.

Coaches should have a porter in attendance constantly cleaning and wiping en route. Upon arrival at terminals seats and backs of seats should be removed and dusted by the air blast, floor should be scrubbed and all wood work below the top of the windows washed and wiped; seats and seat-backs then replaced and the whole interior sprayed with a 5 per cent. solution of formaldehyde by means of a spraying apparatus carried on the back like a fire extinguisher. Car should then be closed and allowed to remain so for at least three hours, and then rewiped with clean, sterile cloths.

The Operative Relief of Brain Compression from Intracranial Hæmorrhage.

By James P. Warbasse, M. D.

[*Continued from page 503.*]

There are cases, of course, that show heavy brain pressure and yet pull through without any operation. I remember one of injury over the forehead, across the supra-orbital ridge, with evidence of fracture, who developed in a couple of days very marked symptoms of pressure, even to the extent of stupor, and yet went on to complete recovery; and I was able to follow him until he died of pneumonia some years later. At the same time I believe such a case should be operated on, as a rule, if circumstances permit.

Then, there is another class of symptoms, that perhaps the speaker referred to, the so-called Jacksonian symptoms—unilateral spasm and paresis. I remember one such case, the result of accident, where there were typical one-sided seizures, and in the interim almost complete paralysis. The blood was found not outside the dura, but in the cortical substance itself. It was let out and the lad recovered fully and has since remained well—a couple of years.

One other point might be mentioned, and that is, that the best treatment always is prevention. While we cannot, of course, prevent the accident that has happened, there are cases in which the apoplexy does not develop until some time, a day or more, later. This, with care, we probably can avoid. The general principle to be applied here is the use of moderate depressants to the circulation. By their use the shock effect seems to be mitigated, any partial injury to the vessels is given a chance to recover, and we are much less liable to have an effusion. This is perhaps hard to demonstrate, since we may not know what has been prevented; but the principle is a perfectly clear one, and apparently we see good results from following it.

Dr. C. F. Barber: Mr. President, I have nothing to add. The cases which I have operated upon have been somewhat similar to those which have been reported. I have one case in mind which occurred recently; a case of traumatism, where a man was thrown violently over the dashboard of a car, striking upon the occipital region. Here there was some little depression. The man became insane following this accident, and operation was advised and consented to. The operation was performed in Dr. Maddren's service at the King's County Hospital. We found there a very slight depression in the bone, but extending laterally, probably running well over into the temporal region. A trephine opening was made, and some little bloody serum escaped. Not much importance was attached to this, but the fracture was traced out and the inner table of the skull was found depressed almost throughout line of fracture. Probably 2½ inches of bone was removed in length laterally, by an inch in width. The dura was not incised in this case. The accident occurred some days previous to the time of the operation, the man was moved several times, and while it was the impulse, you might say, of the surgeons to open that dura, Dr. Browning, who was present, strongly advised against it, and I think his good judgment in that matter was the means of doing this man considerable good; because in the removal of this bone a great deal of pressure was relieved, and we have found since that improvement has steadily gone on. A certain amount of absorption probably had taken place if there was intradural hæmorrhage, as indications pointed to, and if his improvement does not continue we have still the option of opening the dura and removing what clot, if it be organized or not, remains there. That is only an illustration of what the other gentlemen have said, except it is a case a little older in duration than any of them. I have done a good many of these operations since 1885, I think when I first became interested in the subject, and it is one which should be more generally taken up and looked to. The operation should be practiced a great deal more frequently than it is. I think the tendency of the surgeon is to be a little too conservative in this matter. If they would push on and do a little more brain surgery the results will soon show for themselves. I believe that it is not always necessary to open the dura on the first trephining. It is sometimes well to wait and see what improvement takes place, and this I think should be borne in mind in not only operating for hæmorrhage, but also for neoplasms and other intracranial troubles.

Dr. D. Myerle: Bearing upon the propriety of operation in cranial injury, I recall a case

that occurred while serving in the Eastern District Hospital. A boy was brought there, having been hit with the corner of a brick. He suffered by slight concussion, but considering the manner of his injury operation was advised; to this the parents would not consent, preferring to take him home and await developments. It was my good fortune to keep him under observation; within a few months the lad exhibited very marked evidence of cerebral irritation; from a mild, docile boy he became wholly unmanageable, so vicious that it was dangerous for other children to play with him. The parents now appreciated the wisdom of early interference and readily consented to operation. He was removed to the Methodist Hospital, in the service of Dr. Fowler. The inner table was found depressed and the dura adherent; the ultimate result was the disappearance of all the unfavorable symptoms as affecting his disposition, the boy now contributing to the support of the family.

Dr. Warbasse: There is much that can be said on this subject, Mr. President, and certainly a discussion of this kind might be quite exhaustive. The point which a previous speaker has made as to the danger of these symptoms coming on gradually some time after the accident and the advisability of resorting to methods for preventing the development of these symptoms is a practical and important matter. I have in mind cases in which the symptoms of compression were absent for hours, or even days, after the infliction of the accident, but that in the presence of restlessness or delirium the symptoms of compression gradually developed. I recall now a case of hæmorrhage associated with fracture of the skull in a patient who presented no symptoms of compression at all for several days. Things had been going on very well, when gradually the symptoms of compression developed and operation disclosed a recent hæmorrhage.

The source of these hæmorrhages is a matter of interest. In the case of the man whom I presented here to-night I am satisfied that he suffered from fracture of the base of the skull, and yet the characteristic symptoms and the symptoms which we have been accustomed to regard as pathognomonic were absent in that case. There was no sign of oozing from the nose, or the mouth, or the ears, or subconjunctival œdema or ecchymosis, and it was only the presence of a persistent bloody oozing from the region of the base of the brain which would lead one to believe that this man had suffered a fracture of the base.

Dr. Charles Phelps, in his recent work on the "Traumatic Injuries of the Brain," has collected a large number of cases in which autopsies have been made, and he has endeavored to associate the relation of the autopsy findings with the clinical signs which these cases have presented. I have taken the pains to note down some of the findings of these cases, particularly with regard to the appearance of bloody or serous oozing from the nose, mouth or ears in cases of fracture of the base of the skull. He has reported 286 cases of fractures of the base, 110 of which recovered and 176 of which died. Upon these cases were made 146 autopsies. The cases which showed evidences of hæmorrhage externally were 67, and there were 61 cases in which there were no signs of external bleeding at all—a showing which is not in accord with our previous understanding of this symptom. In half of the cases, almost, there was no signs of external bleeding, in which cases the autopsy showed fracture of the base of the skull.

In nine cases of fracture involving the petrous portion of the temporal bone there was oozing from the ear in five cases, and in four cases no sign of external oozing at all.

In 12 cases of fracture involving the petrous portion and the middle fossa there was oozing from the ear in six cases; from the ear and nose in two cases; from the ear, nose and mouth in one case and no hæmorrhage in three cases.

In 12 cases of fracture of the petrous portion and the posterior fossa there was bleeding from the ear in five cases; there was postmastoid œdema and ecchymosis in one case: there was bleeding from the ear and nose in three cases, and in three cases there was no hæmorrhage at all.

In 14 fractures involving the petrous portion of the temporal bone, the middle and posterior fossæ of the skull, there was bleeding from the ear in six cases; from the nose and mouth in one case; from the nose in three; from the nose, mouth and ear in two, and no hæmorrhage in two cases.

Then, briefly, in nine cases of fracture of the anterior fossa there were signs of external hæmorrhage in four cases, whereas, in five cases there was no sign of external hæmorrhage at all.

In 17 cases of fracture involving the middle fossa there were four cases in which there was external hæmorrhage, and in 13 cases there was no visible sign of external bleeding.

In 21 cases involving the posterior fossa there was no hæmorrhage in 21 cases.

In 13 cases involving the anterior and middle fossa there was hæmorrhage in eight cases and no hæmorrhage in five cases.

In five cases involving the posterior and middle fossæ there was hæmorrhage in one case and no hæmorrhage in four cases.

In two cases of fracture involving the anterior and posterior fossæ there was hæmorrhage in one case and no hæmorrhage in one case—all showing the danger of pinning too much faith upon the symptom of external

bleeding in diagnosing fracture of the base of the skull.

A previous speaker has referred to the necessity of persistence in hunting out the source of compression when the unmistakable signs of compression exist. In this first case also, when the dura was first opened, I remember that I was surprised to encounter no sign of compression to speak of at that location over the motor area, but that a continuation of the search, trephining lower down, revealed an abundant flow of bloody serum welling up from the region of the base of the brain.

It is a most gratifying thing, as the gentlemen who have preceded me have said, to observe the recovery that takes place in just this class of cases when dealt with immediately. We see the most pronounced symptoms of compression, particularly in those cases in which there is a compound depressel fracture of the skull, make perfect recoveries when immediate operation is done; and we see the most trying and persistent symptoms exist when even slight compression remains unrelieved. We also know the very great difficulties encountered in endeavoring to relieve these symptoms when they have existed for years, manifesting themselves in epilepsy and mental disturbances. Even when the surgeon is able to discover the defect and remove it—even then his efforts are often without avail.—Brooklyn Med. J.

Rupture of the Quadriceps Extensor Tendon.

By A. C. Panton, M. D., Portland, Ore.

Rupture of the quadriceps extensor tendon, not a very rare accident, presents some features so different from rupture of any other tendon, and is such a serious injury, that one would expect to find abundant literature discussing it; but the fact is that little or nothing is said about it in our standard treatises on surgery; and in none of the works in my possession have I been able to find anything about the technique special to operations for its repair.

Dennis' System does not even allude to it. Park's "Surgery, by American Authors;" Treves' System; Da Costa's "Modern Surgery;" Moullin's "Treatise on Surgery," and other authorities consulted, merely speak briefly of tendon injuries and their treatment in general, suggesting an incision down to the point of rupture and suture of the tendon ends; or treating the condition by rest and position. Da Costa says: "The best procedure in treating rupture of a tendon is incision and tendon suture."

I have found a discussion of the rupture of the quadriceps tendon in a report of a meeting of the New York Pathological Society, at which Dr. Chas. McBurney showed a patient with a perfect result after operation for rupture of the quadriceps extensor tendon of both limbs, one rupture occurring two and one-half years after the other.

There was a considerable gap in the divided tendon at time of accident and the parts were united in each instance by two sutures passing through the lower end of tendon and the upper edge of the patella. He attributed the freedom from adhesions in the joint to washing it out with sterile salt solution and early passive motion.

Dr. Markoe reported a case with rupture of only the central portion of the tendon, treated by putting the leg in plaster of Paris, with practically a perfect result. Dr. Gerster reported two cases, one operated, and one not, both giving good results. Dr. Willy Meyer thought that if patients were young and had sustained this injury, operation should always be proposed; but not in the aged, or where narcosis is not well borne. An interesting article by Dr. Andrew McCosh of New York, in "Annals of Surgery for 1897," page 355, tells more than I have been able to find anywhere else about the injury under discussion. He says that where rupture is complete, operation is called for, as non-operative measures give far from satisfactory results, especially where the rupture is above the patella; but that it should be performed only by surgeons of skill and experience, and when the conditions are favorable for perfect asepsis. Otherwise a different plan of treatment should be carried out, at least temporarily, until the surroundings are more favorable. He considers the best time for operation five or six days after the injury, when, as he says, "the acute stage of the joint hyperæmia has subsided." He reports two cases treated by incision and suture of the tendon.

Rupture of this tendon may take place either from muscular action, or direct violence when the muscle is in a state of tension. When rupture is complete the patient will be unable to rise or to extend the limb, and a gap will be found in the tendon. The condition is very characteristic, and easily recognized if one is on the look out for it.

The knee-joint is much larger and more complicated and has a much more extensive synovial membrane than any of our other joints. We have to bear this in mind in considering operations for the repair of rupture of the quadriceps extensor tendon, as in order to reach and reunite the tendon we must necessarily lay open the joint and run the risk of introducing septic germs into it, and thereby producing a condition infinitely worse than was already present—endangering limb and life. This is the special difference between

dealing with a rupture of the quadriceps extensor tendon and any other tendon which is apt to be ruptured; and the possibility of infecting the knee-joint is such a grave one, that we may well pause and consider whether we are perfectly sure of our asepsis or not, before venturing to expose the interior of the knee-joint, especially after a recent traumatism, when the conditions are most favorable for the culture of pyogenic bacteria.

Therefore I think that a treatise on surgery which makes the bald statement that "the best procedure in treating rupture of a tendon, is incision and tendon suture," gives advice which should be qualified. Otherwise it may lead to disaster by tempting practitioners to operate, under unfavorable conditions, on the particular tendon under consideration this evening. Even when the ends of the tendon, after rupture, are widely separated, if we put the limb at rest for a sufficient time to allow nature to do all she can toward repair, a useful although weakened limb will be the result; and it will be much better for one who has not had experience in aseptic surgical work, or where the surgeon cannot be reasonably sure of his asepsis, e. g., in private practice or in a loosely conducted hospital, if he will content himself with non-operative measures. Where only the central portion of the tendon is divided, with but slight separation of the ends; and the lateral expansions of the tendon are intact, it is better to do nothing more than to fix the limb, say with plaster of Paris, put it in the best position to relax the muscle, and leave it so for a month or six weeks, using the limb with care for some time afterward.

I will conclude by giving a history of the following case, alluding in passing to the technique of operative interference:

H. W., age 35, native of Kentucky. Family history good. Had acute rheumatism 12 years ago. Ill three months. Health good since. Bartender; rarely takes a drink of any stimulant. June 5, 1898, at 3:30 p. m., attempted to board an electric street car moving pretty rapidly. By some means his body was thrown outward and his left knee came in contact with the dashboard of another car coming in the opposite direction. He held on, and was dragged aboard, and afterward carried to a drug store, where two physicians found a downward dislocation of the patella, and reduced it under anæsthesia.

I arrived as he was recovering from the anæsthetic, and was invited to examine the knee; and discovered a gap above the patella, the upper border of which could be distinctly outlined, much more so than that of its fellow of the opposite side. Skin torn. It was evident that the tendon of the quadriceps extensor was ruptured. The limb was helpless, and there was a decided interval between the tendon above and the patella below.

He was removed to the Good Samaritan Hospital, where I had the limb shaved, scrubbed and dressed antiseptically. The dressing was changed next morning and the limb again cleansed and generally prepared for operation. At 1:30 p. m. the patient was anæsthetized and the limb received a final preparation, when, assisted by Dr. J. J. Panton, I made a transverse incision just above the patella, opening the knee-joint, which was found to be moderately distended with bloody fluid and shreds of tendon. The tendon had been torn from the patella, the upper half of the anterior surface of which was denuded of its fibrous and periosteal covering. The torn end of the tendon presented long shreds, some of which were entirely separated. After irrigating the joint with normal saline solution and trimming off the ragged, shreddy end of the ruptured tendon, I passed a kangaroo tendon suture transversely in and out like a purse string, from left to right, through the proximal end of the tendon; then in and out across through the tendinous expansion which still covered the lower half of the anterior surface of the patella from right to left to the point of beginning. This suture when tightened approximated the parts well; but to ensure against failure in the event of its tearing out from muscular contraction, I put in two more vertical sutures through the tendon above and the fibrous tissue over the patella below. The parts were thus held firmly in place. The limb was dressed antiseptically and put up in a plaster of Paris splint from the toes to the groin.

If the patella had not been stripped of its fibrous coverings, I should have drilled holes through its upper edge and passed the sutures through them. In two weeks the sutures were removed through a fenestra in the splint, and the limb was kept in the splint for two weeks longer, when the tendon was found firmly united, the parts having healed by primary intention. After this the patient was allowed up on crutches. At first wearing a light posterior splint, and gradually regained the use of the limb. He now does his ordinary work, which is sometimes heavy, and walks without a limp. He says he can hardly tell that the limb has been injured.—Medical Sentinel.

Ruptured Popliteal Artery, Operation, Death.

Dr. Howard R. Chislett.

Case I: Wm. S., aged sixty-three; married, farmer by occupation.

History.—This patient was admitted to the hospital at 4:55 p. m. on the 7th of June, and the officers of the patrol wagon gave us this meagre history: While walking across the street in the down-town district this patient was struck by a street car, was unconscious

when picked up and remained so upon admission.

Examination.—The temperature was 97°, the pulse 112, and respiration twenty when the patient entered the hospital. The face was pale and cold, the surface of the body clammy, and he was having involuntary bowel movements. The physical examination showed a few points of contusion about the body, the main one being an abrasion of the back. The right thigh was greatly swollen, measuring almost double the number of inches of the opposite side. The femoral artery could be traced four inches below Poupart's ligament, but neither popliteal, the posterior tibial nor the dorsalis pedis pulsations could be determined.

Treatment.—The patient's leg was elevated, the limb enveloped in cotton and an even temperature maintained. In a few days we noticed that there was no evidence of collateral circulation, and in about a week blebs began to form below the knee. Up to this time, while the foot was cold and there was loss of sensation and motion, there had been a gradual re-ascending warmth and sensation. One week after the accident there was a distinct line of separation between the sensitive and insensitive parts about four inches below the knee-joint. The patient then consented to amputation.

Operation.—The femoral artery was exposed in Hunter's canal, where it was found pulsating normally although the tissues were greatly infiltrated with blood. An amputation was performed at the junction of the lower and middle thirds of the thigh by the antero-posterior flap method. The arteries were found hard and cordlike, and were carefully ligated with silk ligatures. The wound was sutured with interrupted sutures of silkworm, tubular drains being inserted at each angle of the wound. The patient was put to bed and normal salt enemas of one pint given every three hours. After the operation the pulse and temperature, which had been running from 104 to 120 and 99 to 102, were recorded 152 and 97, the respirations being 28. After the reaction the temperature reached 101°, and continued at about that height for one week, during which time, owing to the sloughing condition of the tissues, we were obliged to remove all of the stitches. In spite of the utmost care in surgical cleanliness the condition went from bad to worse, and even the free drainage derived from the open method of treatment failed in preventing septic absorption, the patient dying just three weeks after admission to the hospital. The post-operative examination of the artery revealed the transverse rupture of the popliteal artery, which I present for your inspection.—The Clinique.

A Case of Traumatism of the Knee-Joint.

By J. H. Baker, M. D., Salisbury, Mo.

I was called July 21, 1897, to see Miss M. C., aged 18 years, with good family history, who had, seven weeks previously, received an injury to her left knee by reason of a fall from a bicycle.

The patient was an experienced cyclist, but the young man who was to accompany her was an amateur. They mounted their wheels and started off down an incline of one of our beautiful country roads. After they had ridden about 200 yards, the young lady looked back and observed that her escort had lost control of his wheel, and with remarkable presence of mind realized that unless she could escape, an accident was inevitable. She quickly turned to the roadside and endeavored to dismount and while poised in the attempt to do so her escort struck her, both persons and wheels piling into an indiscriminate heap, severely wrenching and bruising her left knee, besides inflicting other injuries of much less concern.

Of course the accident ended the ride and the pleasure of the morning; in a very short time her knee was immensely swollen; the family physician was called and poulticed the limb. For seven weeks poultices and liniments were alternately used, with but little improvement; and while the limb had not been immobilized, neither had it been flexed since the injury, although daily attempts had recently been made, but failed in consequence of pain and the need of anæsthetics.

On examination I found: (1) General tenderness over the whole surface of the knee and acutely so over the outer condyle of the femur. (2) Swelling—left knee being three inches larger in circumference than the right. (3) Pain. (4) Abnormal heat, which indicated inflammatory lesions, still existed.

The patient was anæsthetized, Dr. Hurst administering the chloroform; I found the knee ankylosed from adhesions, but under the anæsthetic and forcible flexion the adhesions were broken up with an audible snap. After a thorough massage treatment with passive motion the injury was dressed with absorbent cotton saturated in creolin solution, teaspoonful to the quart of hot water; rubber tissue was then placed over the cotton and a roller over all; the same dressing was repeated the next day; on the third morning the knee presented a "washerwoman" appearance; but little tenderness, free from pain, swelling reduced until there was but half-inch difference in the circumference of the knees. Massage and passive motion was repeated, after which the knee was thoroughly painted with ichthyol,

cotton, rubber tissue and roller bandage applied as before.

I then immobilized the injured limb by the use of a posterior tin splint extending from the upper third of the thigh to the foot. I then had a cork sole two inches thick added to her right shoe, and put my patient on crutches; thus, by elevating the right foot the injured leg could swing freely and comfortably, producing extension by its own weight. Every third or fourth day thereafter the dressing was removed and massage and passive motion resorted to, the same dressing reapplied until the temperature became normal in the injured knee. At the end of six weeks all my landmarks had disappeared, viz., pain, tenderness, swelling and abnormal heat, the knee presenting a normal contour with restoration of function perfect.

The incentive I had in reporting this case was for the purpose of provoking a discussion upon the mooted question of complete immobilization for joint injuries; therefore, the question is: Should a joint be completely and thoroughly immobilized in case of severe injuries until it gets well? Then if needs be, break up the adhesions? Or should we use massage and passive motion (after the acute stage) during the process of treatment, reparation and restoration of function?—Medical Review.

Acute Myelitis.

ARTHUR H. READING, M. D., CHICAGO.

Mr. B., aged 38 years, had scarlet fever when 8 years of age, has not had any disease since. Never missed but two days' work in thirty years, and this was on account of a carbuncle. Occupation, was express messenger on a railroad. Habits, used tobacco and liquors some all his life; never to excess. No history of venereal disease.

On January 15, 1896, he was injured in a railroad accident. A freight had run on ahead of the passenger train, expecting to clear at a switch, knowing that the passenger train was behind time; but this train was running about sixty miles an hour and trying to make up the lost time, when, in coming around a curve, it ran into the rear of the freight. Some timbers were forced through the end of the express car and struck the messenger while he was at work. He threw up his arm and received a blow upon it and upon his head, and at the same time a large piece of wood, probably fourteen feet long and about four to six inches in thickness, crashed through the car and struck him just below the small of the back.

He fell forward upon the floor of the car unconscious and was picked up by the baggageman. The first symptom was a feeling that he could not sit down, that the rectum had dropped out. A stunned and dizzy feeling in the head. Bruises were found on the right leg, right shoulder and on left side of head and on the left arm. He continued to the end of his run, and then remained in bed nearly all day and waited for the return trip, leaving at 7 o'clock that evening. He felt sore, stiff and numb and laid down most of the night, not doing much work as messenger.

He arrived in Chicago at 1 o'clock the next day, and came to his home and went to bed and remained there until the next day, when he came to my office. He felt sick and sore all over, had difficulty in walking on account of this, and also numbness. He said that he had no control of the flow of urine soon after he was hurt while on the train, and that he was still troubled in that way when he came to see me.

Pain was a prominent symptom in the small of the back, especially over the spine. There was some swelling and some discoloration of the skin in that region. He complained of headache and a numbness in the right leg. About this time he lost control of the muscles of the rectum and the passages were loose. The pain increased in the back, with great tenderness upon pressure. The numbness increased in the leg every day. Headache increased. The stomach became irritable and the digestion of food quite imperfect. The right leg showed weakness and trembling and the numbness increased until the sense of feeling was nearly lost.

The symptoms increased and paralysis of motion and sensation with progressive atrophy of the muscles were present. The patient lost about thirty pounds in weight in about four months. The left leg is weaker and trembles when required to support the body for a short time.

Nervousness is now a prominent symptom and the slamming of a door will make the patient jump as though touched with an electrical shock. Sudden spells of pain in the back, shooting up to the head and over to the eyebrows, are of common occurrence, accompanied with a trembling and numb feeling all over the body and unconsciousness for ten to twenty minutes and a weakness afterward. The shaking or trembling of the muscles is not noticed in the paralyzed leg. He has had a girdle sensation all the time. He is obliged to use crutches to move around and must be careful about his diet and especially careful not to receive a sudden jar or make any misstep.

In this case the injury was received at about the fourth or fifth lumbar vertebræ and upper part of the sacrum; thus the cord was injured in this portion, became inflamed, and a softening and degeneration of the substance taking place. The anterior horns of gray matter being affected first, shown by the paralysis of

bladder and rectum, the disease has ascended some and spread until the lumbar plexus and sacral plexus are affected, and we have as the result: The weak stomach, paralysis of bladder and rectum and the muscles of right leg, the atrophy, loss of sexual power, loss of reflex excitability, etc.

The treatment has embraced electricity to retard paralysis and give strength to the muscles of the left leg. Tonics, iron, calisaya, etc., digestives for the stomach. Remedies to lessen the number of passages from the bowels. Warm applications for pain and remedies for general indications. The prognosis is unfavorable for recovery; the length of time for the disease is from a few days to many years, but usually the disease progresses rapidly and a patient does not live but a few weeks.—Chicago Medical Times.

Treatment of Wounds.

By J. E. Summers, Jr., M. D., Omaha, Neb.

TETANUS.

This is a disease due to a specific wound infection, and is characterized by painful tonic contractions of muscles of voluntary motion, beginning with those of the jaw or neck, and spreading to the muscles of the trunk and extremities. The germ causing tetanus was first discovered in 1884 by Nicolaier, but it was not until 1889 that bacteriologists succeeded in making pure cultures. To Kitasato, the distinguished Japanese scientist, belongs this honor.

In order to comprehend more fully the essential factors in the causation, clinical history, and treatment of tetanus it may be well to refer somewhat to the results of bacteriological studies of the tetanus bacillus. The bacilli are slender and straight, of slight mortality, and present on one end an enlarged or pin-headed extremity. This enlarged end is the spoor or offspring of the bacillus. The germ is anærobic in character, i. e., cannot live in the presence of oxygen; grows best at the temperature of body, having slower developing powers at lower temperatures, and below 56 degrees F. ceases to grow. Dried spores live indefinitely, but are killed in a few minutes if exposed to moist heat at the temperature of boiling water. "They withstand in the moist condition for an hour a temperature of 80 degrees C., a property which was utilized by Kitasato to destroy other bacteria in obtaining pure cultures of the tetanus bacillus. The spores survive and preserve their virulence for ten hours in 5 per cent carbolic acid; they are killed in fifteen hours. They are not killed by putrefactive bacteria."—(Welch.)

It is instructive to note that in experimental tetanus the period of incubation after inoculation of an animal varies from a few hours to as many days, and although this is also true of man, yet infrequently many days or even weeks elapse before the symptoms of tetanus develop after infection. The rapidity of the development of tetanic symptoms after infection must depend upon the dose and the miscibility of the tissues at the point or surface of inoculation with the bacilli so as to produce the toxins or ptomaines whose action upon the spinal cord produce the peculiar muscular spasms.

Notwithstanding the tetanus bacillus is widely distributed, more especially in warm climates, having been discovered in almost all kinds of outdoor dirt, manured ground, etc., yet because of the anærobic character of the germs, their growth in wounds is mostly confined to those in which they are carried deeply into the tissues at the time of the production of the wound.

Before the cause of tetanus was discovered the clinical history of the disease, and possibly the treatment, was as well taught as to-day, but because of ignorance as to the causative factor many fancied theories were advanced in this disease, as in most others, relative to rather mysterious nervous influences, climatic changes, etc., being responsible for its production.

Tetanus may follow injuries and wounds of one part of the body as well as another, although the feet and hands, and especially the former are most often subjects of punctured wounds likely to be infected by the tetanus bacillus—punctured and lacerated wounds leaving foreign bodies, and those likely of contamination with street dirt, garden dirt, and manure; for example, splinters from boards on old fences or those lying around on the ground; old rusty nails, parts of 4th of July explosives "set off" in public streets or in the house yard. Some years ago a large number of cases of tetanus were reported following little wounds from parts of the caps of top pistols. In these last cases, probably the germs were on the hands, and were carried into the tissues along with the pieces of pistol caps.

Tetanus has been known to follow all kinds of operation wounds, but this was prior to the modern comprehension of antiseptic and aseptic surgery. Of course, in emergency surgery it might be impossible to prevent infection by the tetanus bacillus, but in operations of election there could be no excuse. As in erysipelas, the wound of entrance of the infection may be so insignificant that some cases have been called idiopathic, but, with our present knowledge, we must insist that no wounds, no tetanus. In this connection it may be proper to refer to the case of a bull dead of tetanus of whose flesh several persons ate; three were seized with tetanus and two died. This observation was made many years ago,

1857, by Betoli. Tetanus is found in the new born infant, infection occurring through the cord, also in the puerperal woman, or after abortions. These differ in no way from the common varieties of tetanus.

Clinical History.—Tetanus is either acute or chronic. The acute form is ushered in from a few hours to three weeks after infection. Most commonly two or three days elapse between the time of infection until the first symptoms develop. Then the patient notices a difficulty in opening the mouth, with more or less cramping in the muscles of mastication. The neck may be a little stiff and the patient attribute the whole difficulty, which in the beginning is usually mild, to "taking cold." In some hours the symptoms become aggravated and the cramping of the muscles of mastication becomes so severe that the patient cannot open the jaw, or can at best only slightly separate the teeth (lock-jaw). The muscular contractions are painful, usually excruciatingly so, and fluids are swallowed with great difficulty. The muscles of the face and back of the neck soon become involved, causing a peculiar expression called risus sardonicus. Sometimes before the face muscles are involved, those of the trunk and extremities exhibit spasmodic contractions with cramping pains. As in experimentally produced tetanus in animals, the muscles of the parts nearest the point of inoculation are first effected, so in man the first muscular spasms may appear near the wound. The muscular contractions soon become almost continuous; swallowing is painful and difficult, and often brings on fresh muscular spasms, in fact any stimulus, as a sudden noise, cold draft, or any irritant or voluntary effort, may do this. The back muscles may contract so as to produce opisthotonus. Lateral and forward contortions are sometimes observed. Except during unusual muscular contractions, the patient lies on his side with the head drawn back and the spinal arch exaggerated. There is perfect consciousness. There is retention of urine and the bowels refuse to act because of the contraction of the sphincters. The urine is albuminous. Most commonly there is fever from the beginning which may be quite high. More rarely there is no fever, but usually the fever of itself is not alarming.

Diaphoresis is almost always a feature of the disease and occurs always after severe convulsions. There is little sleep without drugs. Attempts at swallowing may bring on a renewal of convulsions; the face may become cyanotic because of the spasm preventing respiration or causing a closure of the glottis. In the intervals of spasms, the face is anxious and pale. Death is generally the result of exhaustion or spasm of the muscles allowing of respiration. Very high temperatures are common a short time before and after death; a fatal termination occurs most often before the end of the fifth day and can occur within twenty-four hours. In the chronic form the symptoms occur later, after infection, and are milder in character. There is little or no fever. The onset of the symptoms follows in the second or third week after the injury. The clinical picture is quite similar to that of acute tetanus, only not so impressive. There are remissions and even intermissions of all symptoms. Gradual improvement takes place and the patient recovers. Death may take place.

Head Tetanus.—A very dangerous though rare form of tetanus follows infection of areas supplied by the cranial nerves, especially in the neighborhood of supraorbital branches. There is paralysis of the facial nerve with trismus, and at times great difficulty in swallowing. A maniacal frenzy is sometimes observed. There may be more or less general tonic muscular spasms.

Diagnosis.—There should be little difficulty in making a diagnosis of tetanus. It has to be differentiated from inflammatory difficulties about the mouth or temporo-maxillary joint. These can be detected by inspection and palpation, and in case of the joint being affected, this is most commonly unilateral. In tetanus there is an early rigidity of the muscles of the neck. In severe strychnine poisoning there are usually complete periods of intermission (found also in chronic tetanus). The muscles of the hands are rarely involved in tetanus, in strychnine poisoning they commonly are. The spasms of hydrophobia are clonic.

The prognosis is bad in acute tetanus, but the favorable signs are late onset, long duration, lengthening of intervals between attacks of muscular cramps. Statistics seem to prove that an attack coming on under ten days after infection only 4 per cent recover; after ten to fifteen days, 27 per cent; after fifteen to twenty days, 45 per cent.—(Rose.)

Treatment.—Careful antisepsis is of the greatest importance as a prophylactic measure, and besides all punctured and other kinds of wounds likely to have carried the germs of tetanus into the tissues should be freely opened, all foreign bodies removed; cleansed by, first, using peroxide of hydrogen or pyrozone, because of the anærobic character of the bacillus; then thoroughly antisepticized with pure carbolic acid; wash this away with 95 per cent of alcohol. Tincture of iodine or a saturated solution of permanganate of potash may be employed. All such wounds should be treated on the open, free drainage, antiseptic plan. After the development of the symptoms, the same antiseptic plan of treatment should be followed as far as practicable. All irritation should be avoided and absolute quiet enforced; liquid food may be swallowed, or failing in this, a tube may be introduced through the nose and suitable nourishment poured

through it into the stomach. Sedatives, such as chloral, bring some relief to the patient, but it is doubtful whether or no a patient was ever saved by drugs. When these drugs are used they should be given so as to produce their physiological effects and control the convulsions. No stated doses can be given. The giving of sedative drugs is recommended chiefly as a humanitarian practice. Chloroform is useful to control spasms.

The belief of the writer is that in the working out of the antitoxin treatment of tetanus lies our only hope of a cure. In experimental medicine much has been learned and accomplished, but practically in the treatment of the human sufferer from tetanus little has been accomplished.

The serum to date is simply an immunizing agent and not an antitoxin or agent capable of counteracting the effects of toxins already in the blood. Immunizing injections should be given in suspicious wounds, and in the beginning of tetanus the antitoxin as made should be tried with the hope of its modifying the symptoms.

COMPOUND FRACTURES.

In cases of compound fracture the fate of a limb and often a life depends upon the care with which the wound is handled from the time immediately following the accident until the dressings and splints are applied. Independent of the purely surgical treatment of the injury, great importance must be attached, in bad cases accompanied by sever shock, to the means employed in combating shock and preventing increased trauma and irritation in the transportation of the patient to his home or a hospital. Given a case of compound fracture sufficiently grave in character to produce dangerous depression, the first aim of the surgeon should be the administration of restoratives. Usually it is necessary to rip or cut the clothing in order to inspect the site of fracture. If hæmorrhage is going on this should be controlled by direct pressure applied by means of antiseptic gauze and a bandage. Failing these, any freshly washed and ironed material may be substituted. Spurting vessels may be secured by artery clamps, which, when the urgency admits, must be washed or dipped in some strong antiseptic. However, the surgeon should not stand on antiseptic ceremony, but immediately stop a free heæmorrhage by direct digital pressure or the application of the pocket-case artery forceps. In serious injuries, accompanied by free hæmorrhage, the immediate control of the bleeding is of the first importance. If the source of the hæmorrhage is not to be reached by the ordinary first aid means just mentioned, an elastic or some improvised tourniquet should be applied to the limb above the injury at a point where the main artery can be compressed with the least constricting force. Attention is directed to this last matter, because it has been observed that in compound fractures resulting in a devitalization of the parts below the injury, if any elastic tourniquet had been rather tightly applied and allowed to remain a considerable time before the devitalized part was removed by operation, that the flaps of the wound made by the surgeon sloughed. It should also be remembered that when pressure is made directly onto the wound, wide extravasation may follow; likewise if infection germs have already entered the wound prior to the surgeon seeing the case and the application of his compresses, these germs may be forced into the tissues by the extravasating blood current. A wound which might have been made safe by the employment of antiseptics would possibly in this way be rendered impossible of sterilization. Therefore, for this reason, and also when marked extravasation of blood is going on with little external hæmorrhage, it is safe to presume that a large, deeply situated branch or a main vessel has been wounded. Under these circumstances a tourniquet should be used as just suggested. Except for the combating of shock and the control of excessive bleeding, the duty of the surgeon who sees the patient for the first time is to apply a temporary antiseptic dressing without any attempt upon his part to explore or handle the wound. The usual signs of fracture, together with the presence of a wound at or near the site of crepitus and increased mobility and change of axis, are sufficient for the diagnosis. Nothing can be gained at this time by an exploration, digital or instrumental, and much damage can be done, yet how common to learn of the efficiousness of some doctors (usually hangers on) called upon to care for those seriously injured, when carried into the nearest drug store. The writer has treated many cases which had been fingered and probed with and without attempts at antisepsis. This harmful and useless interference having been done at places and under circumstances that no profit could have been made of any knowledge gained. He is confident that much unnecessary suffering, and occasionally death, even in this our boasted era of surgery, results.

[*Concluded in next issue.*]

Never close any wound of the abdominal wall till all hemorrhage has ceased. Never under any circumstances apply pressure to a wound of the abdominal wall to arrest hemorrhage. Never mind increasing a superficial wound of the abdomen in order to remove a foreign body or to secure a bleeding point. —Fenwick.

Personal.

Dr. S. S. Johnston, lately surgeon for the O. R. & N. Co., has located in Lewiston, Idaho.

Dr. J. D. Plamondon has been appointed assistant surgeon for the O. R. & N. Co. at Wallula, Wash.

Dr. J. S. Reuter has been appointed assistant surgeon in the O. R. & N. Co. Hospital at Walla Walla, Wash.

Dr. John Punton of Kansas City is to read a paper on "Misconceptions Concerning Locomotor Ataxia," and Dr. H. A. Leipziger of Burlington, Ia., one on "Gangrene from Carbolic Acid," at the next meeting of the Tri-State Medical Society at Quincy, Ill., April 4-5.

Dr. Howard J. Williams of Macon, Ga., the president of the Georgia Medical Association, has gotten out a very attractive program for the next annual meeting. The session, which will be held in Macon on April 19-21, is the semi-centennial gathering of the association and among the prominent essayists we notice Drs. H. A. Hare and Joseph Price of Philadelphia and Nicholas Senn of Chicago. There is to be a symposium on "Ether Anæsthesia," among the participants being our colleagues, Drs. W. H. Elliott of Savannah and S. C. Benedict of Athens.

Dr. George S. Rennie of Hamilton, Ont., was appointed surgeon to the Toronto, Hamilton & Buffalo Railway at its commencement. Later he was surgeon to the Michigan Central Railroad on its Toronto, Hamilton & Buffalo division. In 1898 he was appointed surgeon-in-chief of the Toronto, Hamilton & Buffalo Railway, and surgeon to the railroad hospital.

The doctor takes a great interest in military matters. He was gazetted assistant surgeon in the Thirteenth regiment of infantry in July, 1891, and has since risen to be surgeon-captain. In company with his senior officer, Surgeon-Major Griffin, he has always taken an active interest in ambulance work, and at the present time the Thirteenth has a most efficient ambulance corps.

In addition Dr. Rennie is on the staff of the Hamilton city hospital and examiner in medical jurisprudence in his alma mater, Trinity College, Toronto.

Never attempt to reduce a dislocation of one humerus in an old person without first examining the state of the arteries to inspire you with caution and gentleness. Never put a booted foot on the axilla to reduce dislocation. Always reduce by some other method if ribs are broken on the same side.—Fenwick.

Railway Miscellany.

The Pay of American Railway Labor.

There is considerable matter which is worth the consideration of railway employes in the report of Professor Weyl, on "The Condition of Railway Labor in Europe," in the January bulletin of the Department of Labor.

To begin with, Professor Weyl shows that the average annual compensation of railway employes in England is $292.57. The annual wages of the same class in the United States is $545.

We find that over 86 per cent of the 266,000 employes of the United Kingdom receive only between $6.08 to $7.50 a week, while only 21 per cent of our employes, excluding clerks and salaried officers, receive as little as $7 a week. In this country the remaining number, over 622,000 employes, or nearly 79 per cent, receive an average weekly compensation of $12.42. In other words, only four men in a thousand of the railway employes of the United Kingdom receive as much as $12.17 a week, while 780 in every thousand of our railway employes receive $12.42 a week.

In the United States the lowest wage paid railway labor is $7 a week to trackmen, who receive on the average $1.17 a working day. The lowest rate paid in the United Kingdom for a week's labor is $2.43. Railway wages in the United States are generally understood to be better than those for other classes of work, while of those in England Prof. Weyl says:

As far as can be seen from the rather imperfect statistics at hand, the scale of remuneration for the whole group of railway employes is slightly lower than for labor in general in the British Isles. The railway service shows a larger proportion of men obtaining the highest weekly wages, 40s. ($9.73) or over, but as from 90 to 91 per cent of the employes in this, as in other employments, receive between 15s. and 35s. ($3.65 and $8.52), the comparative disadvantage of the railway men is to be found here. A disproportionate number of railway men receive between 15s. and 20s. ($3.65 and $4.87) per week, while a comparatively small proportion receives between 20s. and 35s. ($4.87 and $8.52) per week.

In regard to the pay on the French railways, Prof. Weyl's investigation shows that in France 80.54 per cent of the railway employes receive less than $1 a day.

In Belgium railway clerks receive an average of $20.79 per month, while over 60 per cent of sub-clerks receive only from $175 to $202 per year, or an average of $18.38 per month. Signal men receive from 15 cents to 69 cents a day, the incompetent, i. e., the very

young, very old and women, receiving the lower sum. Not 1 per cent of the male signal men receive over 58 cents per day, while the pay of the same class of workmen in the United States is $1.74 per day.

On the Prussian state railways workmen are entitled to only one free day a month, though the law insists that they be given an opportunity to attend divine service once in two weeks—on Sundays. The average yearly wages in Prussia of shop employes and trackmen in 1897 was $256 and $182 respectively. The average annual wages of all classes of railway labor was $335, as compared with the average in the United States of $545.

Railway rates on the whole are lower in the United States than in any other country. The volume of traffic is less. That the companies manage to handle that traffic at those rates, while maintaining the high standard of wages, and still live, is an amazing tribute to American ingenuity and operative ability. Every reduction of the earning power of the companies threatens a reduction in the standard of wages, and for their self-preservation, if for no other reason, it is to the interest of the employes to stand by the companies and protect their revenues in every way that they can.

Thermostatic Regulation of Car Heating.

In the issue of The Railway Age of March 3 was given a description of a new system of regulating car heating by means of thermostats, which has been put in experimental service on trains of the Chicago & Northwestern and Chicago, Milwaukee & St. Paul railways, and reference was made to the record of certain tests made by the former road. The figures showing the results of the use of the thermostatic equipment are given herewith.

The trial was made between Chicago and Des Moines. A thermostat was placed in the closet at each end of the car and readings were taken also from a thermometer at the middle of the car. The ventilators were open as usual (about 5 on each side), going west, but on the return trip were closed until after passing Clinton. In the report to Mr. C. A. Schroyer, from which the figures are taken, it is stated in reference to the air pressure, that when the guage at the valve registered about 3.25 pounds per square inch, the valve began to pass steam, and when the pressure was increased to about 7 pounds steam was completely shut off. The readings as taken each half hour are given in the accompanying tables.

The reading of the first hour is stated in the report as hardly fair, since the car was heated at the station with no air pressure in the train pipe and consequently no motive power to actuate the valve of the thermostat. It will also be noticed that the difference in temperature at the two ends of the car was in the same direction in both parts of the trip, which is accounted for by the fact that thermostat M was in the men's closet, and its open condition occasioned a temperature from 6 to 10 degrees lower than the body of the car. The comparative uniformity of temperature, however, under unfavorable conditions, seems to indicate the utility of the system.

OBSERVATIONS GOING WEST.

Number of Reading.	Thermostat M.		Thermostat L.		Temp. of Car Center.	Temp. Outdoors.
	Temp.	Air pressure Operating Valve.	Temp.	Air pressure Operating Valve.		
1	71	Closed	76	Closed	..	16
2	64	2	67	13	..	.
3	68	8	72	10	65	18
4	67	0	70	9	66	..
5	68	6	72	13	69	13
6	67	1	67	3	64	13
7	68	6	70	5	70	16
8	70	9.5	71	5.5	69	13
9	70	7.5	70	4	69	15
10	69	5	68	0	66	15
11	68	0	68	0	66	16
12	70	7	72	3	72	16
13	70	6.5	71	5.5	69	17
14	70	9	72	10	67	18
15	69	5	70	4	67	18
16	70	6	70	3	68	16
17	70	9.5	70	3.5	69	17
18	68	1.6	68	0	64	15
19	71	9.5	71	3	72	15
20	70	10	72	6.5	71	15
21	68	4	69	2.5	66	15
22	72	12	72	12	72	10
23	70	7	73	12	71	7
24	67	0	70	....	66	7
25	72	11	75	15	75	7

OBSERVATIONS COMING EAST.

Number of Reading.	Thermostat M.		Thermostat L.		Temp. of Car Center.	Temp. Outdoors.
	Temp.	Air Pressure Operating Valve.	Temp.	Air Pressure Operating Valve.		
1	69	6	72	8.5	72	2
2	69	3.5	70	4.5	66	3
3	70	6	72	11	72	3
4	66	0	71	5 5	67	5
5	65	0	70	7.5	67	8
6	67	0	73	9	72	10
7	66	0	70	8	66	10
8	66	0	70	6.5	65	10
9	68	0	75	15	72	13
10	67	0	72	13	67	13
11	66	0	70	7	66	13
12	69	0	74	13.5	73	15
13	66	0	73	15	66	15
14	65	0	70	11	67	16
15	64	0	69	8	64	16
16	66	0	71	15	69	13
17	66	0	72	13	69	14
18	72	7	75	15	73	14
19	70	6	75	15	69	14

Both branches of the Montana legislature have passed a bill making it a misdemeanor to steal rides on a railroad train, and giving trainmen the powers of constables to make arrests.

Do not forget in dislocation of the carpal bones that the great point is to see that the motions of the fingers are early restored.—Fenwick.

The Ministerial Half-rate Question.

The much advertised case of the Rev. W. B. Walker of Joliet, Ill., against various railways for refusing to grant him transportation at the ministerial half-rate came up before the interstate commerce commission at their meeting in Chicago this week. It is unfortunate that we should have to speak of the case as "much advertised," because there is an interesting point at issue that ought to be decided, and possibly there is a principle at stake. The methods by which the matter has been agitated, however, have unavoidably created an impression that somebody was desirous of gaining notoriety from the proceedings, which, rightly or wrongly, has necessarily alienated sympathy from the complainant; and, however interesting the matter at issue may be, it is impossible to enter with any great enthusiasm into the desire to see the present case assume much importance. As a matter of fact the standing of the complainant was shown at the hearing to be so faulty that it is doubtful whether it will be possible for the commission to do otherwise than dismiss the case.

The question whether or not the railways can at will deny to one properly accredited minister of the gospel the courtesies which they extend to gentlemen of the cloth in general is of itself one of considerable interest, and it has already been discussed at some length in The Railway Age. There is no doubt that the phrases of the interstate commerce commission which permit the granting of reduced rates to ministers are purely permissive, not mandatory. This does not, however, preclude the possibility that, when the companies have taken advantage of those permissive phrases and make a practice of extending half rates to ministers in general, they may be guilty of unlawful discrimination in refusing to grant that rate to one individual minister. On the other hand, the railway companies undoubtedly have the right to make regulations of their own, defining the qualifications which shall bring individuals within the category of those entitled to the reduced rate. They are by no means compelled to recognize as a minister of the gospel everybody who chooses to call himself such, and the certificates themselves distinctly state on their face that they may be revoked at any time. It is difficult to say that the companies are answerable to anybody in law for prescribing the regulations which shall govern them in this matter, or that there is any limitation, except their own caprice, to the extent to which they shall or shall not take advantage of the permissive clauses of the act.

In this particular case the railways do not deny the standing of the reverend complainant as a minister of the gospel. They do not deny that, through the passenger association, which they concede to be the agent of each of them severally for the issuance of these certificates, they refused to issue a certificate to the complainant while granting such certificates and selling tickets at reduced rates freely to others of no superior standing in the same church. Did or did not this constitute unlawful discrimination? Can any man be the victim of such discrimination or of undue prejudice when, although he was refused favors extended to his equals, he was still at any time at liberty to avail himself of the rates which are made to the public in general, which are on file with the interstate commerce commission and the reasonableness of which is not attacked.

Unfortunately, it appeared at the hearing that it was at least doubtful whether the complainant had made such a case as to give him any standing before the commission. The petition itself was faulty in that it did not specify that the transportation asked for and refused was of an interstate character. This might be a technical fault in the petition, which could easily be amended. It happens, however, that the complainant did not, during the period for which transportation was averred to have been denied him, make any interstate trips. He did not travel outside of the state of Illinois. His complaint was made against three railway companies—the Rock Island, Alton and the Santa Fe. On two of these—the Alton and the Santa Fe—he testified that during the year he had not even desired to make any trip requiring interstate transportation. It is evident that so far as these two companies are concerned, therefore, he had suffered no injury. He had desired to make a trip requiring interstate transportation on the Rock Island road and, as he testified, had been restrained from so doing by the fact that he was unable to obtain the reduced rates. He did not, however, buy any ticket at the regular rate nor did he make tender of the reduced rate in application for such a ticket to any agent of the railway company. Without such payment or such tender it is certain that in a court of law he would not be regarded as having established any just cause for suit. It is possible that the commission will decide in this particular case to ignore the technical invalidities in the camplainant's standing, and will desire to pass upon the merits of the case; but even so, and supposing it to be conceivable that the complainant could obtain a favorable decision from the commission on the real points at issue, it is impossible to believe that on appeal any regular court would be governed by the same generous latiture. The points at issue are interesting, but they are hardly likely to be settled without a new complaint nor, we would add, are they likely to suffer if they are brought up by a new complainant.

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THE X-RAY.*

By G. G. White, M. D., El Kader, Iowa

The history of medicine is the history of the physician. From the time he first applied healing balms to mankind his life has been one continual struggle for existence. No martyr of science has been more true to his profession or suffered more from public persecution than the physician of the past. Medicine, like other branches of science, has suffered the rise and fall of Aryan civilization. Born in the cradle of ignorance and superstition, reared through the dark ages by the monks of Europe, trampled on by savage hordes who overran that country during the fifth and sixth centuries, it showed itself in the dim twilight of modern research, a distorted mass of knowledge, unknown and unrecognized by the scholars of Europe. The crusades of the tenth and eleventh centuries had their effect upon civilization,—also had their effect upon the history of medicine. The old form of government that ruled Europe for five centuries had told its effect upon its people; war, disease and rapine had served them all alike. The king was stricken with his servants, the serf with his serfdom, the lord with his tenants, till people were awakened from the belief that disease and pestilence were a divine curse. And scientific investigations proved all this untrue and carved the way for modern medicine. All this was not done alone, but aided by the staff of science.

It was the stimulus of natural science that gave to medicine its rapid growth during the eighteenth century and placed it on a level with other sciences. No mother could have shown more care for her offspring than "Dame Science" has shown for medicine; for 'twas she that nursed this infant into a sturdy adult age and gave it a heritage that has enriched all its descendants. To her we owe our professional existence and the exalted position medicine now occupies among the sciences. Every discovery of the past has marked the dial of progress upon medicine and every discoverer has paid his tribute of glory. Selfishness and religion have ever kept the wheels of progress clogged. Galileo was imprisoned because his teachings did not agree with the church, Newton scoffed, for his discoveries revolutionized church science. Pasteur's memory will never be free from the scandal of the German press, while all Paris rejoices in the failure of Koch's lymph to cure consumption. Such is the selfishness of the medical mind of to-day, all due to national hatred.

Medicine and science must go hand in hand; one cannot well exist without the other. The dependent relation that one holds to the other is what we as physicians ought to understand. There is not a time we cannot apply it in our practice or make use of it in a social sense. The man of to-day, to be a doctor, must be a scientist. Strip medicine of her philosophy and you have but the skeleton of a profession, shorn of all its beauty and its charms. It was the application of rude science to the mind of man that gave us a Jenner, a Pasteur, or a Lister; for what could these men have accomplished without microscopical appliances or a college laboratory that natural science had given them? Every step that medicine has advanced toward that millenial goal was made by scientific art. The day is fast approaching when the physician of the future will no longer base his conclusions upon some doubtful premise, but upon a scientific instrument that is infallible, and with more correctness diagnose and treat all forms of disease from a scientific standpoint.

The nineteenth century has well been called the era of invention. Nothing in the world's history compares with it. The march of

*Read at the sixth annual convention C., M. & St. P. Ry. Surgeons, Chicago, November, 1898.

progress in the various branches of science has been wonderful. The accumulation of wealth, the distribution of education and thought, the association of ideas among the laity have crowned its closing years with a diadem of genius. The discoveries made in scientific medicine are of more importance to us as physicians. From the first artery forceps to the celebrated Röntgen ray mark the first and the last links in the long chain of progress. I wish to call your attention to the latter in this paper.

The celebrated Röntgen or X-ray was first demonstrated by Professor Röntgen of the University of Würzburg, Germany, at the close of the year 1895, and was first discovered by Lenard the previous year. The early history of this ray is too well known by you all to go into detail, but, like most European inventions, it took Yankee skill to bring it into practice. Its first use among the profession did not give creditable results, the rays being so diffused they could not be focused upon any single object, making its outlines very indistinct. Nothing worthy of note was done in this direction until Professor Thompson introduced his modification of the Crookes tube, focusing the cathode rays and projecting them in straight lines, making it possible to detect the most minute foreign body or the slightest traumatism to bone tissue. The reduction in the cost of the apparatus and the use of the static machine as a generator brought it within reach of many physicians, whose experiments have proven it to be a most valuable instrument. I know of no single instrument used in physical diagnosis that is of more use to the corporation physician than the X-ray.

In using the X-ray for diagnosis or therapeusis one should fully understand its nature, the manner in which the ray is produced; the regulation in the amount of the ray and where it is produced with the greatest intensity; also one should fully understand its physiological and pathological effects upon living tissue. It is dangerous to expose a patient to a million volts of electricity passing through an atmospheric medium, though protected as he may be by a current encased in a glass globe. All the casualties that have been reported from injury by the ray have been due to inexperienced hands and without proper precautions. In the demonstration of this mysterious light we will first take up its definition. The Röntgen or X-ray is an invisible light to the unaided eye, whose presence is made known only by a fluorescent screen or a sensitive photo-plate, differing from the ordinary light by its vibrations in ether, being transverse, much more rapid, of higher pitch, and shorter length of wave.

Its source is from electricity, whose current must be of high voltage and low amperage. This can be produced either from an induction coil, or high frequency transformer, or a static machine. The static machine, which I think is most useful to the physician, has these advantages over the other apparatus: (1) Can be used in general therapeutics; (2) A static machine is always in working order, it will last longer, cost is about the same; (3) Has no batteries or induction coils to get out of order; (4) It produces no oscillating current within the Crookes tube; (5) The strength of current is more easily controlled. The ray proceeds in greater abundance from the cathode electrode within the Crookes tube, and is caused by the bombardment of atoms of air against a platimum disk, in a partial glass vacuum. In the ability that one has to keep this atmospheric pressure at such a given point lies the success in the working of the machine.

Laws: First—The rays are invisible. Second—They proceed in straight lines to infinity. Third—They can neither be refracted nor reflected, but can be diffused. Fourth—Their power of penetration of different elements of nature is in the ratio of their atomic weights.

Physiological Effect Upon Living Tissue: First—Is similar to Franklinic electricity.

Skin—First Effect: Act as a stimulant or an irritant. Second Effect: Act as an escharotic or a burn.

Blood Vessels and Capillaries—First Effect: Dilate. Second Effect: Contract. Third Effect: Paralyze.

Nerves—First Effect: If the exposure is of short duration, and a light current, no effect is noticeable. Second Effect: If exposure is of long duration, and a strong current, the post-mortem shows a multiplication of the connective tissue corpuscles in the neurilemma, and thickening of the nodes of Ran-

vier. Third Effect: A further exposure than the above shows breaking down of the axis cylinder of the nerve, a fatty degeneration of the white substance of Schwann and (against the common rule) this degeneration is independent of any neuron.

Retina: I have always noticed a decided congestion of the retinal blood vessels in the operator, after using the machine for sometime. First Effect: Has a peculiar action upon the rods and cones of Jacob's membrane that cannot be explained, caused, no doubt, by a high pitch and rapid vibrations in the ether, much more so than those of sunlight produce upon the eye. Stimulates excretion and secretion. It is a slight stimulant to the heart.

Pathological action of the X-ray de-

FIG. 1.—METHOD OF EXAMINING CHEST.

pends—First: Upon the idiosyncrasy of the patient. Second: Strength of the current and time of exposure. Third: Distance the object is from the focus tube, and if in line of the ray. Fourth: Condition of the surrounding atmosphere. Fifth: The number of exposures made upon the patient. Sixth: If the anode pole is grounded. Seventh: If an aluminum screen is placed between the patient and the tube, and this grounded.

All the above conditions I have found true by careful experiments made upon living animals, and what little literature there is upon the subject. In the one hundred examinations made with the fluoroscope, I have seen no injurious effects follow any of them, and of the number of radiographs taken, have had no bad results, in one case, exposing the chest of a boy to the ray for 25 minutes with no bad results following. Of course, I always take the proper precautions, by placing an aluminum screen between the patient and the instrument; this being grounded cuts off the powerful atmospheric currents around the tube, and does not hinder the penetrating power of the X-ray, thereby protecting your patient.

Kind of Instrument Used: I use an eight-twenty six-inch plate, Atkinson & Toepler, glass covered static machine, with a double spark gap at either pole, one pole being made movable, so it can be approximated to overcome the rise of atmospheric pressure within the tube, which always happens if a tube is frequently used. This appliance is also used for the focusing of the rays upon objects of different density, and controlling the penetrating power of the ray. Two silk conductors carry the current to the tube, which is partly enclosed in a pasteboard box, made movable under a canvas cot, thereby freely exposing all parts of the patient to the X-ray, without moving him. (See Fig. 1.) Fitted in the cover of the box enclosing the tube is a metallic diaphragm, made of tin, with an opening about one and one-half inches in diameter. This is used, when necessary, to shut off diffused rays in the detection of minute foreign bodies lodged in the tissues, or the examination of a single organ, or small area of diseased tissue. The fluoroscope should be large enough for exposure of one side of the chest at a time, and well fitted to the face. One should work in a darkened room, or wear smoked glasses a few minutes before examining a patient. He should try and educate his retina to the X-ray well before putting it into practice, as it is difficult for one not accustomed to the ray to make out the outlines of objects; he may also find it difficult to readily discern the change in the shadow of the fluoroscope between a normal and abnormal tissue. As is the law of medicine, he must become accustomed to the appearance of a healthy chest before he can detect a diseased one, or a normal stomach before he can detect a dilated one. But after a few trials one never forgets the normal appearance and the position an organ has in the body. The ability of recognizing pathological changes is acquired more quickly and made more accurately than in

any other mode of physical examination. In the examination of the chest, one should have the patient remove all clothing containing metallic substances. If the patient is a female remove the corset, as the steels might lead to serious error. The tube should always be directly under the part to be examined, from 6 to 8 inches below the patient, and with the fluoroscope in one hand and the other one holding the standard supporting the spark gap, you can, by increasing or diminishing the length of the spark gap, regulate the penetration of the ray as easily and it is as well under control as the tube lens in the microscope. The patient soon becomes accustomed to the noise from the alternating discharge that takes place between the poles and remains quiet throughout the examination.

So far the use of the X-ray has been limited to the diagnosis of disease, both in medicine and surgery. Its action as a therapeutic agent is yet in its infancy. But the investigations that have been made, and their beneficial results show that it possesses an action upon normal tissue, unlike any other therapeutic agent. The physiological effect that it produces upon tissue in the contraction and expansion of blood vessels, the metabolism of the living cell, the stimulating effect upon nerve centers, show that it may yet prove a very valuable adjunct in the treatement of disease. I have myself seen a very obstinate case of eczema disappear after a few minutes exposure to the ray. In diseases of the respiratory tract of a catarrhal nature, great benefit is derived. Although the above conditions may come from the stimulating effect of the ray, I believe there is something more than this, as the case above alluded to had been previously treated by stimulating lotions with no beneficial results.

The use of the ray in consumption has opened the way to a more important field of observation. The effect of the static spray upon the chest of the patient suffering with phthisis is surely beneficial, and many go so far as to say it will produce a cure. The credible results obtained, and the rapid improvement that the patients show from this treatment, allow me to report a few cases, which will demonstrate the good as well as the bad results that may follow from the hands of an inexperienced operator.

Case I: Mrs. K——, a blonde, aged 23, weight, 107 pounds; married, no children. Previous history, negative; enjoyed good health until one year ago, when she suffered from an attack of acute laryngitis. Upon recovery she noticed for the first time two small kernels on either side of the neck, just below the ear, and consulted a physician for their cosmetic effect. I saw her first some two months ago; she to all appearances was suffering from phthisis—anemic, emaciated, had complete anorexia, general malaise, hectic flush on either cheek, night sweats, irritative cough, etc. Temperature was 99 degrees, pulse 84, weak and compressible; physical examination of the lungs revealed nothing abnormal. There were enlargements of the anterior and posterior cervical glands down to the level of the clavicle. Examination of the blood showed the red and white corpuscles 50 to 1, hemiglobin below normal, sputum revealed no tubercle bacilli. Exposure to the ray revealed a very dark shadow, completely enveloping the left apex, also a slight shadowing of the right; inferior lobe of the left lung showed dark irregular spots over surface, giving it somewhat a mottled appearance. Movement of the diaphragm on left side was three-fourths inches (2½ to 4 being normal), while the right side was one and one-half inches. This limited movement of diaphragm always takes place on diseased side, and is pathognomonic. Heart normal. Diagnosis was tuberculosis of the cervical lymphatics with involvement of the lungs. I gave her no medicine, but advised a change of climate. She returned home, and in a week came back to the office, saying she wanted that instrument used again, as she had been improving ever since the last visit to the office. Thinking it was nothing but the psychical effect upon her mind, I discouraged her from taking another exposure to the ray, in which she insisted. Her husband informed me that she had slept well the two consecutive nights following the last examination, with no irritable cough or troublesome sweats. After another exposure of eight minutes I told her to return in about a week, which she did. One could see a decided improvement in her condition; most of her distressing symptoms were relieved, the sweats, anorexia, cough, hectic flush had entirely disappeared. She had gained one and one-half pounds.

Subjective examination showed a temperature 98 3-5 degrees, pulse 74, with a full wave. Counting the blood corpuscles showed one to 125. Fluoroscopic examination revealed a clearing up of the shadow in the left lung, diaphragm moved one and one-half inches. On the fourth day from this last examination her husband informed me of a sore that was appearing at the base of the neck on the left side; fearing it might be a burn from the ray I told him to bring her to the office at once, when I found on the level of the lower third of the clavicle a large suppurating lymph gland. Demonstration of the true nature of the sore, and that it had nothing to do with the ray, prevented any trouble. The above case is rapidly improving. Photograph No. 2 shows the patient in position for treatment by the static bath. She now weighs 127 pounds, everything normal except a slight darkening in the apex of the left lung, and she says, "I feel as well as I ever did."

FIG. 2.—METHOD OF TREATMENT FOR PHTHISIS PULMONALIS.

After experimenting with the current in different ways I found that the same beneficial results were obtained and with greater effect by allowing the static spray to play directly in front of the patient's face, while seated on an insulated stool. This treatment, used twice daily with a seance of three to ten minutes, did not fail to bring relief in every case. In the 22 cases of tuberculosis of the lungs that were treated in this manner, improvement followed in every one, the most noticeable being the immediate disappearance of cough, night sweats, and improvement of appetite. In a few cases where the disease was far advanced before treatment began we used medicine. There was reaction in every case where tuberculin serum was used as an aid in diagnosis. Koch's bacilli were present in ten cases out of the 22; in five cases the diagnosis was made wholly by the fluoroscope, the patients objecting to the use of tuberculin. All the above cases are improving but one, and this was hopeless, when first admitted for treatment. Another suffered a relapse from exposure, but is now improving under the same treatment. In conclusion, I think it is safe to say, from the above cases, that we have a very valuable adjunct in the treatment of phthisis, and an instrument that will render a diagnosis early, which is of so much importance. First, the effect of the ray upon the patient is not injurious, but helpful; second, the static spray is superior to the X-ray in the treatment of this disease. The combination of dietetic and hygienic treatment, with avoidance of unnecsary drugs, will greatly lessen the mortality of this fearful disease, and gradually unfold the boundless treasures contained in that great and powerful therapeutical agent, electricity.

The application of the ray in surgery is well known to you all. Numerous articles in medical journals illustrate this feature well. A few cases have come under my observation, which I will report as follows:

Case I: William R., a brakeman, while making a coupling had his hand caught between the bumpers and fractured the radius at its lower third, with severe injury to the wrist: a physician near by was called, and set the broken fragments, applying a primary dressing, saying the wrist was sprained, but rest would restore the organ to its normal function. Not getting relief from severe pain in the wrist, he consulted me six days after the injury. Examination showed a Colles' fracture of the forearm with tumefaction over the wrist. The fluoroscope revealed great distention of the synovial sacs in the wrist joint, and a fracture of one of the small carpal bones. Its reduction and bandaging the parts gave him relief, and he gradually recovered.

I think many of the so-called sprains of the wrist and ankle joints are really fractures of

some of the small bones that enter into the formation of the joint, as is illustrated in

Case II: A farmer, while sliding down the side of a load of hay, striking upon uneven ground, sprained his ankle. He consulted a physician, who pronounced it a sprain, and applied the usual remedies, but with little relief. One week afterward I saw him, a skiagraph was taken of the ankle, which showed a fracture of the astragalus.

Case III: Master J., aged 12 years, fell while he was running, putting out his hands to save himself he felt something pinch the palm of his right hand as it struck the ground. Constant pain in the injured member caused him to consult me. Upon the fourth week after the injury, thinking that a foreign body might have lodged in the tissues of the hand, I exposed it to the ray for five minutes, and discovered a piece of rusty pin situated between the first and second metacarpal bones. Its removal was easily accomplished, and he made a timely recovery.

Case V: James W., age 24, while hunting with a companion, ten years ago, was accidentally shot in the left wrist with a .22 caliber rifle. Probing failed to reveal the whereabouts of the bullet, which was left to encyst itself. He of late years suffered attacks of severe neuralgia in the same hand, radiating down into the little and ring finger. He was sent to me by a neighboring physician, who, from his history, suspected a foreign body as the cause of his pain. A skiagraph was taken. The bullet was found lying between the radius and ulna at their lower third; its removal caused the neuralgia to disappear.

Case of Calculus of the Lung: Mrs. S., age 33, phlegmatic, mother of three children. She enjoyed good health until three months ago, when she fell, striking the left side of her chest; fainting, she was taken home. There followed pleurisy and traumatic pneumonia; had chill, fever, rusty sputum; fever ended by crisis on the tenth day. Her condition remained about the same for six weeks, when I first saw her. Her features showed the lines of suffering. From the pain on the left side and severe paroxysms of cough she had not slept for weeks, morphine was her only relief. Her complexion was dark sallow, skin shrunken from the rapid loss of superficial fat. Her weight, which had been 176, was now 137; she had given up all hope of recovery. Her cough was in paroxysms and very painful, breaking out into a cold, clammy sweat after every attack of coughing. Sputum abundant of a dark green color, fetid brackish odor. Microscopical examination showed giant cells, karyokinesis, leucocytosis, saprophytic bacteria, and protozoa of ameboid movement, which retained life for many days at ordinary temperature, and grew rapidly in agar-agar. (Will say I have seen this before in sputum of patients suffering with bronchiectasis, but have never been able to classify this organism.) The tuberculin test given to the patient was negative. Under the fluoroscope the superior lobe of the left lung was much darker than normal, movement of diaphragm on that side one inch. In the center of the dark shadow of left lung there was a light area with a dark body in the center, having the density of stone, about three centimeters long by two in width. The right lung was normal to all appearances. Diagnosis was: Delayed resolution in the left lung with gangrene; the dark object I could not explain. Upon treatment for 36 hours with a static spray, she had a severe paroxysm of cough and felt something tear lose about the center of left chest, scratch her throat, and with difficulty spat up a hard lump, which was followed by slight hemoptysis. Examination revealed a calculus about 3½ centimeters long by 2½ wide, composed of shreds of yellow elastic tissue decayed and partially calcified, phosphate and carbonate of lime, traces of uric acid. I was in doubt as to its origin, as I had never seen or heard of one before, but from the history and careful examination of the calculus, and examination by the fluoroscope, which showed the dark object had disappeared, established the origin of the calculus beyond a doubt. She made a slow recovery with occasional bloody sputum for a few consecutive days, returned home in two weeks, and is now threatening a damage suit against the city for alleged injuries. The nature and etiology of a bronchial or lung calculus I know little of, and as to how much the traumatism had to do with the formation of the calculus I do not know. No doubt there was a calcification that came from the gangrene of the lung tissue in the effort of nature to throw it off, which like conditions have occurred in tissues found in other parts of the body.

In summing up the uses of the ray in medi-

cine we can say: That it is a most valuable instrument in diagnosing diseases of the chest; it gives us knowledge as to the extent of disease in the lungs which auscultation and percussion fail to do; that it gives the cause for difficult cases of dyspnœa, where no diagnosis could be made. One can recognize the diseases of the chest earlier, therefore save more lives than by any other known method; it is a most valuable instrument in the diagnosing of pneumonia, showing the stage of the disease, and how much of the lung there is involved; hydrothorax, pneumothorax, edema of the lungs are also readily differentiated.

Examination of the Heart: First, it has demonstrated to physiologists that the so-called apex beat is not the apex striking

FIG. 3.—BULLET ENCYSTED IN HAND FOR 12 YEARS.

against the chest wall, but the wall of the ventricle, and that the apex is one to two inches below this point. Second, it gives the extent, size and position of the heart, thickness of its walls, as also its action. Calcareous deposits around its valves and orifices have been seen. Third, it has established the diagnosis of a difficult case of dyspnœa, due to failure of the foramen ovale to close by a skiagraph, showing the enlargement of the ductus-arteriosus. Fourth, it is a most valuable aid in the diagnosis of aneurism or new growths in the mediastinum or chest wall. Fifth, it is easy to differentiate between pericarditis with effusion and hypertrophy.

DISEASES OF THE ABDOMEN.

First, gives one a good view of the size and position of the stomach. Second, diagnosis can be made of enlargement of the liver, gallstones, enteroliths, fecal impaction, renal and vesical calculi, size and position of the kidneys. Third, diagnosis of uterine fibroids, tubal pregnancy, dermoid cysts, pregnancy and position of child in utero.

USES OF THE RAY IN SURGERY.

First, it is of inestimable value in the diagnosis of foreign bodies in various parts of the body. Their minute size and deep position in the tissues do not interfere with success. Second, the precise location of foreign bodies in the eye can now be accurately determined, and their removal accomplished, thereby saving the vision of many people. Third, the diagnosis of fractures and dislocations in the osseous tissue is readily seen; also a cut showing the extent of the injury enables one to better treat all such cases, and protects you from litigation. Fourth, it saves thousands of dollars to the company and years of suffering to the patient by both seeing the cause, the position and extent of the injury, and thereby settlement is often made. Fifth, fractures involving the tuberosities of bones are readily seen, which otherwise might escape notice. Sixth, many of the so-called sprains to joints are often fractures of some of the bones in proximity. Seventh, all diseases of the bones that alter in any way their density, as rickets, tuberculosis, osteomalacia, etc. It is a most valuable aid in establishing the diagnosis between chondroma and osteoma; also in disease of the spine, fracture and caries, kyphosis and scoliosis, a subdural clot beneath the dura has been seen with the fluoroscope and its removal accomplished.

THE INJURIORS EFFECT OF THE RAY.

There are several cases on record where deep burns and eschars have been produced by exposure to the ray, and some damage suits; but these were made without the proper precautions, and too frequent exposures which were unnecessary. Never have I seen or heard of any serious results following an examination made with the ray where the aluminum screen was used. Some patients complain of numbness and formication in parts after an examination, but they are neurotic subjects, who are always looking for some cause to which to lay the source of their trouble. I have repeatedly exposed parts of my body to the ray for double the length of

time, and have experienced no such phenomena. The X-ray, like all things, in medicine, cannot be used without some discretion, its physiological and pathological action upon tissues made known. If we understand the application and dosage, as in any law of therapeutics, we will find it as safe and as useful an instrument as there is in the profession.

USES OF THE X-RAY TO THE CORPORATION PHYSICAN.

I know of no witness, or word picture, that would more clearly demonstrate to a jury the exact condition of the injury and the result of treatment than the skiagraph. This cannot lie. No cross-questioning can change the picture, neither can it be made to show something that never existed, but stands out in plain written truth, both to the prosecution and the defense. A picture taken at the time of the injury, and one after the patient has recovered (at different angles of the body) will show beyond a doubt whether the physician has done his duty, and the case received the proper treatment, or the patient is suffering from an imaginary ailment that has nothing to do with the injury. I believe there is no better weapon than the X-ray to fight those would-be lawyers, who make it a business to kindle the fire of professional enmity, and know just enough truth about medicine to deceive the people. The rapid method in making the skiagram, the accuracy of the picture, and its acceptance in court make it a most valuable instrument to a railroad surgeon. Case after case, where a verdict could not be rendered, has been decided only by a skiagraphic picture of the injury.

I believe the X-ray has come to stay, its discovery marks one of the greatest epochs in the annals of surgery. 'Twas but a few years since the first exhibition of the rude instrument was given, now mark the wide contrast that genius has made. The marks of progress that characterize the American mind will never allow this momentum to slacken. The untiring energy, work and ambition which crowned our forefathers with the laurels of success still circulate in the veins of the younger members of our profession, and the day is not far distant when we will be able to pierce the farthermost recesses of the human body, and more clearly view the workings of its wonderful mechanism.

What work the scientists and polytechnic schools will be able to do with the new instrument, its latest appliances, remains only for the future to know. There is scarcely an issue of a medical journal that does not contain some discovery made with this ray, and when the limit of this boundless field will be reached we do not know.

But one thing seems certain—the mystery that is involved as to the origin of the ray will never allow the subject to be dropped until the problem is solved.

DISCUSSION.

Dr. D. S. Fairchild: This paper brings up the point as to whether there are not some limitations to be placed upon the use of the X-ray in medico-legal matters. In the last three cases in which I have been called as a medical witness in court the X-ray was used against the company by pretenders, who simply knew how to make a picture or skiagram, but did not understand the scientific application of it, and it was hard to convince the jury whether a person was competent to make a scientific picture or not. I hope the gentlemen in the discussion of this paper will consider the use of the X-ray from that standpoint. The question comes up whether there are not some elements of danger in the manner in which the subject is put.

Dr. I. K. Gardner: The president (Dr. Fairchild) has voiced my sentiments, and I would like to take issue with any man when he says that the X-ray skiagraph cannot be questioned. It is being questioned. A good deal depends upon the perspective and the position of the camera. All these points should be considered, whether a picture is taken by the ordinary camera or not, and received as evidence, and whether it reflects a scientific condition of things, the photograph must be defended. I can imagine a skiagram depicting such a condition that the protrusion of bone on the other side is altogether magnified in appearance. It may be enormously magnified and give a wrong impression. Such a skiagram needs defense.

Dr. J. H. Rothwell: I recall a case which illustrates this subject very nicely. It was a case where suit was brought not against a railroad company, but a private physician. A man in driving a wagon fell off on a bridge and under the wagon, fracturing his thigh.

He was taken several miles, put in charge of a physician, who used apparently all the care that is usually taken in treating fractures of the thigh. In spite of extension and everything that could be done, the man had more than two and a half inches of shortening. He had cartilaginous union, and brought suit against the physician. The lawyer for the plaintiff thought it would be exceedingly smart to take his client to Kansas City and have X-ray pictures of the leg taken at several different angles. Two or three pictures were taken, and the lawyer asked the privilege of introducing them in court as evidence. The evidence seemed to be all against the physician; finally it was decided to allow the skiagrams to be introduced as evidence. The lawyer who introduced the skiagrams was a very smart man, but when he showed them to the jury the lawyers on the other side said, by looking at the pictures it would be found that the bone was broken in two places; that three inches of the central piece had been split in two, and of course it was perfectly natural that there should be two and a half inches of shortening. However, it was proved that the physician was really at fault.

Dr. D. S. Fairchild: The criticism I made at first was not with the intention of discouraging the use of the X-ray, but simply to show that trouble may arise from its use. The laity get a notion that X-ray skiagrams are absolutely certain and give the exact state of affairs, and that there should be no doubt in regard to X-ray pictures made by a person who does this work. A case came under my observation not long since in which an engine got off the track and ran over the toes of a switchman, and his toes were turned backward with a considerable degree of violence. After a time the man was discharged from the employ of the company, and about two years after the accident he commenced a suit against the company. An X-ray picture was made which showed that there was a subluxation of the dorso-phalangeal joints. That was the allegation. It was alleged also that the X-ray machine showed that the tendons had been over-extended. An examination showed a very wide foot; that the man had been accustomed to a narrow shoe, and the toes were overlapping each other; the little and big toes were turned toward each other, and the joints were wider at the inner and outer border than at the internal point. The picture was taken from above downward, and not in the direction in which the subluxation would have occurred. Of course, the X-ray was unfairly treated in this case, because it was made to show the condition of the joints in the opposite direction instead of crosswise, as would be the condition of the displacement had it actually existed. This picture was taken to show that the man's foot had been seriously damaged while in the employ of the railroad company. It is for this reason that I feel at this time called upon to make some observations, not because of any defect in the X-ray itself, but in the manner in which it is used to determine whether the X-ray operator is a skillful or an ignorant man. I think the courts have taken the proper position in reference to this matter, that skiagrams are only admitted as secondary evidence.

Dr. White (closing the discussion): There were several points in the paper that I was obliged to leave out on account of time. I have encountered several cases in my experience that have been decided and could not have been decided in any other way. Of course, we know in medicine there are very few things that are practically certain. My experience with the X-ray has been quite satisfactory, and I have obtained results that have been very creditable outside of railway surgery.

Iodoform Eczema: A Family Idiosyncrasy.

A. W. Esler, M. D., describes, under this heading, a rather interesting case of iodoform eruption occurring in a man who had his ankle dressed with this drug after a deep ax wound. The patient was first seen on August 3, 1897, and was then dressed with cyanide gauze. In four days the wound was healed (?), and was then powdered with iodoform and a pad of dry lint applied. The next day there was some eruption around the wound, but the dressing was continued. The day after this the eruption had spread up to the knee, there was a large crop of pustules and vesicles, and the edges of the wound gaped slightly. The patient then mentioned for the first time that he had been dressed with iodoform twice before in his life, and each time he had suffered from an eruption after the application. He also stated that his father and one sister were very susceptible to iodoform, the drug causing an eruption of blisters in both of them when used. The patient made an uninterrupted recovery directly the dressing was changed.—Australasian Med. Gaz.

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NOTICE TO MEMBERS.

Dr. C. W. P. Brock, chairman of the committee of arrangements, requests that the title of all papers to be read at the next meeting of the I. A. R. S. should be sent him as soon as possible. Dr. Brock's address is 206 East Franklin street, Richmond, Va.

The headquarters of the association will be "The Jefferson," one of the most beautiful and elegant hotels in this or any other country.

It is advised that the chairman of the committee of arrangements be informed as speedily as possible of the probable number who will be in attendance on the approaching meeting. It is very essential, for reasons that will suggest themselves, that this information should be had some time before the meeting.

TUBERCULOSIS IN RAILWAY COACHES.

In the winter of 1890-1 Prausnitz discovered tubercle bacilli in railway carriages arriving in Berlin. About this time throngs of consumptives were traveling to Berlin, attracted by Koch's discovery of tuberculin, and in 1892 Petri, with his assistants, HH. Kolb and Friedrich, began a series of experiments, the results of which have been recently published in the Revue d' Hygiene.

Cornet had sometime previously established the infectious nature of the dust in living rooms occupied by tuberculous patients, and Petri's researches, which were carried out at the Imperial Sanitary Bureau at Berlin, had for their object to ascertain: The presence of pathogenic bacteria, their relative number in different compartments and the best way of cleansing the cars and disinfecting them.

The carriages were examined as quickly as possible after arriving at a terminal station and 383 compartments in all were examined. Dust was collected from the ceiling, the walls and the furniture and 117 guinea pigs were inoculated with this dust, three of which died from tuberculosis. Petri's experiments show that the direct source of tubercle bacilli and other pathogenic micro-organisms is the patches of expectoration on the floor, and that this source of infection is more marked in the third and fourth class than in the first and second class carriages; the ceilings contained the least number of germs. Concerning the number of germs found:

In fourth class compartments there were present 12,624 per square of 100 centimeters. in third class 8,481, in second class 4,347, and in first class only 2,583. Besides tubercle bacilli numerous other germs were found: Pus cocci, Eberth's pseudo tuberculosis bacillus and the bacillus of mouse septicæmia. Of 91 guinea pigs inoculated with the sputum 28 died as a result of the inoculation, the remaining 63 were killed after a lapse of six weeks and three of them found to be affected with tuberculosis.

Petri then made some experiments to test the value of various methods of cleansing and disinfection. Three compartments were infected with different sorts of germs and then

cleansed with soap and a solution of carbolic acid. The results showed a diminished number of bacilli, and when disinfection by steam was used the destruction was complete. He found that in compartments not upholstered, even though badly soiled, all disease germs can be removed from the ceilings, sides and seats by washing with a 1-100 potash soap solution, followed by copious rinsing or sprinkling with water, and then by dry rubbing. Similar measures produced a great reduction in the number of germs found on the floor. As a result of Petri's experiments the Prussian Minister of Public Works has issued an ordinance regulating the cleansing of railway carriages and waiting rooms. Certain stations are set apart for the cleansing process and the method to be adopted is the same as set forth above. The carpets and upholstery of the "wagon-lits" and first and second class compartments are to be disinfected by steam at the stations designated.

Translations.

A Case of Incomplete Fracture of the Humerus

By Dr. H. Verneuil of Brussels.

(Translated for The Railway Surgeon.)

Incomplete fractures of the long bones are very rare and the bone generally retains a more or less marked curve as the result of the accident. In children bony curves have been observed without fracture.

A bone is rigid, its elasticity is small and only sufficient at most to momentarily acquire a small degree of curvature. If it is subjected to great force it either breaks or quickly returns to its former shape according to its degree of resistance. Uhde has nevertheless described a case of traumatic curvature of the ulna without fracture in a man who had his forearm caught in a cog wheel. As precise details are given of this unique case we must conclude that some pathological state of the osseous system was present.

In cases of infraction, on the contrary, the bone remains curved, for the ends of the fragments cannot be juxtaposed, hence the part that is left intact cannot regain its normal direction. As a general rule incomplete fractures are due to the same causes as the complete. I do not think that the normal elasticity with which a bone may be endowed in exceptional cases plays any important part, except perhaps for the clavicle, the situation of which in the skeleton creates special conditions of elasticity for it. On the other hand, increased resistance intervenes sometimes in a manner not to be doubted.

When a bone whose resistance is very feeble is submitted to the action of direct or indirect force a fracture is produced. This phenomenon may be divided into several stages, though in reality they are not separated by any appreciable interval. 1. The bone becomes curved. 2. The convex face of the curve gives way and it breaks. 3. The concave face ruptures in its turn. If the third stage does not occur we have an incomplete fracture, and for this to take place it is necessary either that the intact portion of the bone acquire a sudden resistance or that it be removed from the action of the force causing the traumatism. These favorable conditions will be found realized in cases where the force expends itself partly or wholly on obstacles in the vicinty of the bone, either directly or through its intervention. It is only in exceptional cases that these conditions will be realized, hence we can readily see why incomplete fractures are rare.

The patient, De B., a horse clipper, was driving along a country road in a cart, one of the wheels ran into a deep rut and he was thrown to the ground, falling between the cart and a stone wall. The patient landed with his right arm extended parallel with the wall, the cart wheel impinged violently against the antero-internal surface of the arm, the opposite one being applied to the wall. When I examined the patient on the morning of the second day I found the lower half of the arm and the upper half of the forearm the seat of a considerable swelling. On the antero-internal face of the limb there were contusions of various depths. All active movement was impossible and even passive motion was extremely painful. Owing to the enormous swelling about the elbow it was impossible to feel the bony landmarks or to ascertain if they were intact or fractured or displaced. No crepitation was perceptible, but at the lower

end of the humerus a hard body could be felt, assuredly a bone or a piece of bone, but it was impossible to determine its source. There was manifestly no fracture of the humerus in its continuity. Probable diagnosis: Fracture at the elbow. The arm was wrapped in cotton and massage commenced immediately.

[*Concluded in next issue.*]

Hospital Notes.

The twenty-ninth annual report of the Alexian Brothers' Hospital at St. Louis, of which Dr. Frank J. Lutz is surgeon-in-chief, is at hand. During the year 6,254 patients were treated by half-tones of the wards, operating rooms and other parts of the building.

Annual Report of the Chief Surgeon of the C. & O. Railway.

Chief Surgeon C. W. P. Brock of the C. & O. Hospital Association, in his annual report shows that during the year 1898, up to November 30th, 370 patients in all were treated at the railway hospital at Clifton Forge, Va., with only 11 deaths. The number of sick patients treated was 242; the number of injured men, 128.

The number of employes treated outside of the hospital was 682. Seven hundred and seventy-seven cases of minor injuries were

REPORT OF THE RELIEF TRANSACTIONS OF THE EMPLOYES' HOSPITAL OF THE KANSAS CITY, FORT SCOTT & MEMPHIS RAILROAD SYSTEM FROM JANUARY 1, TO DECEMBER 31, 1898—N. J. PETTIJOHN, M. D., CHIEF SURGEON IN CHARGE—HOSPITAL CAPACITY 40 BEDS.

	Surg.	Med.	Total.
Number of patients in hospital January 1, 1898	9	5	14
Total number treated at hospital during year	361	642	1.003
Total number discharged at hospital during year	349	623	972
Total number deaths	1	5	6
Total remaining in hospital December 31, 1898	11	14	25
Total number of cases treated in Kansas City outside of hospital	250	1.510	1,760
Total number of cases treated at line points	648	5.675	6,318
Total number of cases treated at all points	966	7.135	8.101
Total number of cases treated at hospital	361	642	1.003
Grand total	2,220	14,952	17,182

NUMBER OF PRESCRIPTIONS FILLED BY ASSOCIATION.

Total general hospital	5,073	At outside points	3.592
At Memphis dispensary	2,130	At all points	14.007
At Springfield dispensary	3,004		

REPORT OF THE MISSOURI PACIFIC RAILROAD HOSPITAL. WILLIS P. KING, M. D., CHIEF SURGEON IN CHARGE. HOSPITAL CAPACITY 65 BEDS, OFTEN INCREASED BY CROWDING.

	Out Patients.	Cases Remaining Dec. 31st, 1898.	Cases Adm'td.	Cases Treated.	Discharged.	Died.	Remaining, Dec. 31st, 1898.
All causes. Total treated	7,457	58	1,528	1,586	1,502	9	75
Classes.							
I. Zymotic	744	6	161	167	161	1	5
II. Constitutional	977	10	193	203	188	3	12
III. Local	5,360	18	851	872	834	3	35
V. Developmenta	25	..	1	1	1	..	..
V. Violence	351	24	319	343	318	2	23
Class I.							
Order 1. Mismatic diseases	744	6	160	166	160	1	5
Order 2. Dietetic diseases	..	..	1	1	1	.	..
Class II.							
Order 1. Diathetic diseases	968	7	189	196	185	..	11
Order 2. Tubercular diseases	20	3	4	7	3	3	1
Class III.							
Order 1. Diseases of Nervous System	709	7	112	119	116	1	2
Order 2. Diseases of the Eye	263	2	48	50	49	..	1
Order 3. Disease of the Ear	55	..	12	12	12	..	..
Order 4. Diseases of the Circulatory System	103	..	18	18	17	1	..
Order 5. Diseases of the Respiratory System	2,013	3	169	172	154	1	17
Order 6. Diseases of the Digestive System	1,508	2	309	311	303	..	8
Order 7. Diseases of the Urinary System	152	..	18	18	16	..	2
Order 8. Diseases of the Generative System	22	..	9	9	9	..	..
Order 9. Diseases of the Locomotory System	38	..	19	19	17	..	2
Order 10. Diseases of the Integumentary System	497	4	140	144	141	..	3
Class IV.							
Order 1. Developmental diseases	25	..	1	1	1	..	..
Class V.							
Order 1. Accidents and Negligence	351	24	319	343	318	2	23

—The Kansas City Lancet

treated and we note that over 25 per cent (1,680) were charity cases, showing the great amount of aid rendered by these unostentatious institutions. Tables are given of the cases treated by the various departments, from which we learn that all varieties of surgical and medical diseases are met with during the year. The report is profusely illustrated by surgeons of the company along the line of the road.

Of the 11 deaths 9 were employes and 2 were outside patients. One employe died from injury and 8 from disease. The two outside patients died from injuries.

The general hospital is located at Clifton Forge, but auxiliary hospitals for injured em-

ployes that cannot be transported to the general hospital are located at Norfolk, Va., Richmond, Va., Paint Creek, W. Va., Covington and Lexington, Ky.

The main institution at Clifton Forge was opened for the reception of patients December 1st, 1897. It is thoroughly equipped in every particular. Employes are taxed 10 cents per month on wages under $40 a month; 20 cents a month on wages over $40 and under $75; 35 cents a month on from $75 to $100, and 50 cents a month on salaries over $100.

The Gould Hospital Service.

The special committee of six appointed by the Missouri Pacific and Iron Mountain railroad employes held a conference March 17 with General Manager Doddridge, to discuss plans for bettering the hospital service on the Gould system. This committee represented all the branches of labor on the entire system. Mr. Doddridge told the members of the committee to formulate plans and present them to him, and that he would then take them under consideration and do whatever he could to better the hospital system. The men desire that an injured or sick man may be treated at his home by a local railway surgeon, instead of being compelled to travel several hundred miles to one of the Missouri Pacific hospitals. —Med. Review.

A Fine Hospital for the Employes of the Interoceanic Railway.

The splendid hospital for employes of the Interoceanic Railway Company is an institution that merits great praise. Mr. G. M. Stewart, the general manager, has taken great interest in the medical department and in every way gives it his heartiest aid and support. The hospital has been in existence for many years. Its present location is two blocks from the San Lazaro station, City of Mexico. The former chief surgeon was Dr. Bray, who in March, 1897, resigned and was succeeded by Dr. Leopoldo Castro.

The funds for the support of the hospital are furnished by the company and its employes. Every month the company furnishes $160 and the employes pay in one per cent. of their monthly salaries. This month there is on hand a surplus of $3,600.

In 1897 there were only five rooms for patients in the hospital, every one containing two beds; but Dr. Castro has, during the present year, increased the number of rooms to eight and has added six more beds. There is an operating room, containing an operating table and all necessary surgical appliances. The office contains an emergency case which is used only on extraordinary occasions. In it can be found medicines and instruments necessary for all sorts of accidents. At no time is it made use of except when on account of fire or some other catastrophe the regular medicines and instruments are lost. There is also a case of medicines that is the same as those furnished all passenger trains. It is to be used in case of wreck or accident. Every month the trainmaster sends these cases to the chief surgeon to be replenished and put in order. All kinds of diseases except venereal are treated at the hospital.

Last year 400 patients were treated in the hospital. During the month of February of this year there were 82 cases in the hospital here, 84 in Puebla, 31 in Jalapa, 13 in Veracruz and 11 in Cuautla. These figures show the value of these hospitals to the railroad men. There are regular hospitals located at Puebla, Jalapa and the city of Mexico. At Cuautla and Veracruz are local surgeons who, if necessary, send their patients to the nearest railroad hospital. That in the city of Mexico generally contains from four to six patients. Sometimes it is completely filled; then again it is empty.

In all probability next year may see a change in the location of the hospital. The value of the institution has been so thoroughly demonstrated and the appreciation of it by the employes has been so marked that the erection of a new building is being talked of. The officials of the road are determined to furnish their employes with the best hospital facilities. If the present plans are carried out the new building will be designed with special reference to the needs of patients and will in every respect be equal to the finest hospital in the world.—Two Republics.

A Fracture of the Radius with Singular Features.

By Stephen Harnsberger, M. D.

I am led to offer the following notes of a case:

Mr. Ed. W., a young white man, farmer, applied to me on Thursday, October 20th, with this brief history: On Monday he was husking corn, and, after pulling over a shock, he felt a twinge of pain in his left forearm a few inches above the wrist; but as it was not great he paid no special attention to it. He continued at work Tuesday, Wednesday and Thursday. Late in the afternoon of the latter day the pain returned and became gradually more severe. About 8 o'clock that evening he called at my office to have me look at his arm. A thorough examination discovered the left radius broken transversely across at least three inches above its articular surface. No displacement; very slight dorsal tumefaction; linear pain on pressure; scarcely noticeable loss of motion of radius and some crepitus on rotating the bone while the hand was drawn

down. It occurs to me that this is an unusual point of fracture of the radius. Certainly it is unique from a causative point of view, to say nothing of his having been able to use the arm at constant work for four days with little or no inconvenience. It seems to me remarkable that the use of the arm was not impaired. —Med. Bulletin.

Extracts and Abstracts.

Report of Two Cases of Syme's Amputation.

By F. D. Smythe, M. D.

Case I: Negro brakeman in the employ of the Y. & M. V. R. R. was injured near Lula, Miss., July, 1897, by a car wheel passing over his foot. He was attended by local surgeon

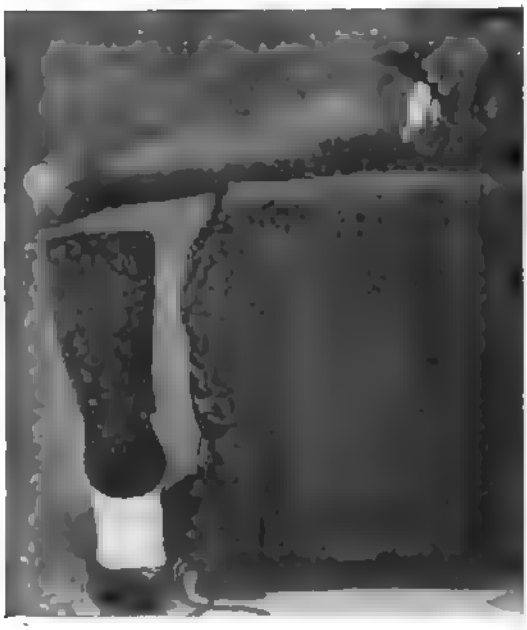

Fig. 1.

and forwarded to the hospital here for further treatment. Examination showed the soft parts badly lacerated, the tarsal and metatarsal bones crushed beyond hope of preservation.

Patient was chloroformed. The lower extremity from the knee down was surgically cleansed. It was questionable whether the condition of heel flap justified a Syme, and but for the many advantages of such a stump to a laboring man, the lower third would have been selected for operation. An observation of cut No. 1 shows the wisdom of choice in the case. The technique as given by Syme was not deviated from. I can do no better than to incorporate in this article Syme's description of the operation: "The incision must be properly made to warrant hope of good result. A transverse incision should be carried across the sole of the foot, from the tip of the external malleolus or a little posterior to it (rather nearer the posterior than the anterior edge of the bone), to the opposite point on the inner side, which will be rather below the tip of the internal malleolus." Dissect the tissues of the sole back, hugging the bone, until point of heel is turned, when the Achilles tendon is cut. The extremities of the incision are now united by a transverse one across the instep, the joint opened, the lateral ligaments divided, completing the dislocation. The lower ends of tibia and fibula are then cleared, the malleoli and articular surface removed by saw, the vessels secured, generally three or four requiring ligature. The posterior flap is brought up and held by silkworm gut sutures. Drainage is obtained by gauze inserted from either side to

Fig. 2.

bottom of cavity, which cannot be satisfactorily accomplished by incision through heel flap, as is recommended by the text books. The stump is covered with a liberal supply of absorbent gauze and cotton, snugly bandaged, completing the operation.

In this case we had some sloughing. The flap fell back, gangrene supervened, and for many days it looked like higher amputation could not be avoided. The wound was treated by wet dressings of carbolized cloth until sloughing ceased. Granulation was now rapid, the flap was brought forward and retained by suitable bandaging from day to day until coaptation was obtained. About nine weeks were required to accomplish the result. The patient insisted daily for over a month upon reamputation. On several occasions I thought we should be compelled to carry out his wishes.

The man is now engaged as flagman, and has a stump well protected, painless, locomo-

tion slightly impaired. Dr. Buford, his family physician, saw to the fitting and adjustment of an artificial limb. It is a very serviceable one and is well shown in the cut. I am informed by Dr. Buford that the cost of such an apparatus is $75; this I think rather a high price, though the apparatus meets admirably the indications, shown by this man satisfactorily meeting the requirements of a flagman.

Case II: Cut No. 2 shows stump of second patient operated upon, taken one month after operation. This man had extensive tubercular disease of the tarsal and metatarsal bones of three years' standing. The same technique was carried out as in Case I. We did not experience any difficulty, however, in getting union. Four weeks after operation the man returned to his home in Arkansas with an ideal stump. He can have artificial appliance adjusted at any time should his occupation demand increase of walking facility.

Syme's amputation possesses advantages over either of the other operations about the ankle. No bone is left to necrose or give pain by becoming displaced. Much less time is required in after treatment, and less demand made upon the healing power of the patient. Experience has shown that no stump is as serviceable as that resulting from a Syme. The main thing to consider in performing the operation is the important fact that the bone must be hugged, otherwise the posterior tibial will be divided before its bifurcation and the principal artery of the flap, the internal calcaneal of the external plantar, be lost, making the operation a failure.

The operation is by no means as easily performed as the description of it would lead one to believe, but the end justifies the means.—Memphis Med. Monthly.

Treatment of Wounds.

By J. E. Summers, Jr., M. D., Omaha, Neb.

[*Continued from page 535.*]

If a bone is protruding it is not wise to replace it until after the careful use of antiseptics, and as this can rarely be done before the patient is moved to his home or a hospital, the best practice is to apply the temporary dressing without interference. In this connection it may be well to take notice of the "First Aid," or Esmarch package, in use in our army and in the Germany army. It contains in a small compass the essentials of a primary occlusive antiseptic dressing; can be carried in the surgeon's bag or ambulance box without danger of contamination, and keeps almost indefinitely. The usual precautions recommended in transporting cases of simple fracture of the lower extremities to their place of permanent treatment must be painstakingly followed. When the fracture is of an upper extremity the sufferer can walk or ride sitting up, unless the nature of the fracture contraindicates, the wounded member being supported in a sling.

Before proceeding to the examination and treatment of the fracture everything should be gotten in readiness as we do for any surgical operation, and especially one where we know that a slip in antiseptic technique may be followed by most serious consequences. In hospitals everything is at hand, but in private practive this is exceptionally so in emergency surgery. If the surgeon has had time to secure a roll of sterilized instruments, so much the better; otherwise, he must either boil his instruments in some suitable vessel; perhaps he may have a sterilizer at hand, or they may be placed in a 1-20 solution of carbolic acid and allowed to remain in this while preparations are progressing; his other armamentarium is supposedly always ready for use. Plaster-of-Paris in bulk or bandage should be secured. The preparations detailed in a former chapter are arranged according to the circumstances and surroundings of the case. Two solutions, one of carbolic acid 1-20, and the other of bichloride of mercury 1-500, must be at hand; from these weaker solutions can be readily made. A piece of rubber sheeting or table oilcloth of sufficient size should be washed in soap and water, sponged off with alcohol, and then douched with a solution of bichloride of mercury 1-1,000. Everything being in readiness, the patient should be anæsthetized. After the clothes are removed he is placed upon the operating table, bed or floor in such a position as to allow of the easiest manipulations upon the part of the surgeon and his assistants. The rubber sheet must be put under the injured part so as to drain away fluids into some bucket or pan, and also arranged to shut off the wound from contamination by contact with other parts of the body, bedding, etc. Of course the most painstaking care is exercised by everyone taking part to keep the hands surgically clean. The temporary dressing is removed, if one has been applied, and the wound protected by covering it with a sufficiently sized piece of moist antiseptic gauze. The greater part of the extremity above, around and below the wound is now well scrubbed with soap and water, shaved, and then douched off with a 1-1,000 solution of bichloride of mercury. The area about the wound is now sponged with alcohol and then douched again with a 1-1,000 bichloride solution. Sterile towels, or "clean" towels after being wrung out of a 1-1,000 bichloride solution, are wrapped around the limb above and below the injury and spread about so as to prevent contamina-

tion. It is safer for the surgeon to wear rubber gloves previously sterilized and kept protected and ready for use. These gloves should be drawn over the hands after the latter have been properly washed, and not removed until the limb has been prepared for examination and operation. The gloves can then be pulled off either by an assistant using an antiseptic towel to prevent contamination of his own hands, or by someone whose duty cannot in any way bring his hands in contact with the surgeon's or assistant's hands, the wound, or any article of possible service in the operative technique. In hospital practice it is always safer and should be practicable for surgeon and assistants to wear sterile rubber gloves in all operations. Those taking part in the preparations for an operation changing gloves, with antiseptic precautions, before taking part in the operation procedure itself. These refinements are not absolutely essential, but when practiced are in touch with the technique of the most successful surgeons. One may well wonder, when casually viewing the hands of some general practitioners and surgeons as we meet them in consultation or socially—would it be possible for such hands to be so washed as to be surgically clean! For all such we urge the use of sterile rubber gloves.

TREATMENT.

We now come to the line of treatment to be followed, and this must depend upon what our examination discloses.

The Simple Cases.—In a large percentage of cases the wound through the soft parts is of itself not of great moment, neither is the injury to the bone; the danger to be feared is infection. In order to reduce this danger to a minimum the following practice has given the greatest success: When the bone is protruding it should be thoroughly disinfected with a strong antiseptic. If apparently clean after irrigation, it should be sponged over carefully with a 1-500 solution of bichloride and then irrigated with a weaker solution. Any dirt, coal dust or grease which may have gotten onto and apparently almost into the broken bone should be removed mechanically with forceps and gauze saturated in alcohol. The bichloride sponging (1-500 solution), and later irrigation with a much weaker solution (1-2,000 or even 1-4,000), will make the protruding bone end free from active pathogenic germs. If the skin wound is too small to allow of thoroughly digital exploration, a suitable incision is made and the injury examined by the finger, any loose detached fragments of bone, foreign bodies, and dirt are removed, and if the examination discloses a limited soft part injury the operation is completed by irrigating the wound throughout with a 1-1,000 bichloride solution, and then reducing the protruding end. After this reduction another irrigation with a 1-4,000 bichloride solution is advisable. One or more rubber drains are introduced, a moist antiseptic dressing applied and the limb immobilized. For the purpose of immobilization no material answers quite so well as plaster-of-Paris. A cast may be made to surround the limb, possibly cutting a window over the wound area for the dressing and inspection of the injury. The writer prefers to apply plaster splints, one or more, so as to allow of easy inspection and dressing of the fracture, the whole affair admitting of removal and reapplication.

Plaster-of-Paris Splints.—Having determined whether one or more splints are required to support the limb without covering the wound, and perhaps in some cases this may not be objectionable, suitably sized pieces of heavy muslin or Canton flannel are cut of a length, and when folded three times, of a breadth corresponding to the proportions of the proposed splint or splints. Having spread the muslin (or flannel) out upon a table, a thick cream of plaster-of-Paris is mixed in a basin. The plaster is poured upon the center part of the goods, one-eighth to one-fifth inch deep, from near one end to the other, and then one side is folded over the plaster and the other side over this side, the plaster being covered on one side by one thickness of goods, on the other by two thicknesses. The splint is applied by grasping the muslin near each end and placing it in the position intended. It is fastened by means of a roller bandage, the upper and lower ends being turned down and up respectively and secured with the bandage. The splint soon hardens. One or several splints can be put on in this way, and to render the dressing more firm one or two layers of a plaster bandage can be used. The bandage over the wound can be cut, allowing inspection and dressing without interfering materially with support. Everything can be taken off with pocket-case scissors in a few minutes. A plaster cut with a window soon becomes a dirty affair if there be such drainage, in spite of theoretical obviating devices to the contrary. It is a rare exception for a case to do other than well if the practice recommended is carried out. The drainage tubing is removed under antiseptic irrigation (bichloride 1-2,000) in from six to ten days, and repair progresses, but is delayed somewhat longer than in cases of simple fracture. The wound may not need dressing oftener than once every ten days or two weeks.

The More Complicated Cases.—When extensive injury to the soft parts exists the wound should be so opened and explored as to admit of thorough antiseptic cleansing,

suturing of divided muscles and nerves with well-selected sizes of chromic catgut, and the placing of drains so as to secure the best service. It may be wise to fasten the broken bone ends together with silver wire, heavy chromic catgut, or plates if there is great tendency to displacement, or if there is more than a little separation of the upper and lower ends, because of the removal of many fragments. In this last case it may be wisest to leave the fragments rather than invite non-union, the risk of necrosis being less than non-union if a thorough antisepsis is employed. In the leg or forearm, if there has been a destruction of one of the bones, the other not being fractured, so as to leave a considerable space between the ends, it would be good surgery to resect or fracture the sound bone and thus admit of approximation of the widely separated ends of the injured bone; the extremity after repair would be shortened but useful.

The dressing and management of these more complicated cases is similar to that of less serious injuries just described. As a dressing an inch or two thickness of gauze and a similar thickness of cotton is necessary in all compound fractures, and as a rule the dressing should extend the length of the plaster splint.

Emphysema occurs occasionally about a compound fracture, or even extending widely over a greater or less portion of an extremity. The condition is of little importance and does not mean infection as is apt to be feared.

Infected Compound Fractures.—When compound fractures have been treated as described, they rarely give trouble from infection, but should this follow, we resort to frequent (daily or oftener) irrigations to flush out debris and prevent blocking of drains. Carbolic acid in solution 1-20 may be used occasionally instead of the bichloride solutions, and even it may be practicable and advantageous to mop out certain places with the pure acid, followed immediately by alcohol.

Perfect fixation is of the greatest importance, as tending to limit irritation and prevent spreading of the infection up and down close to the bone and between intermuscular planes.

When sepsis is checked and repair takes its place union may progress in spite of some necrosis about the bone. This necrosis may require subsequent operation, and occasionally results in extensive matting of soft parts with deformity. Prompt antiseptic treatment, and possibly incisions to better drainage, will limit the infection to the soft parts and repair of the bone injury will go on undisturbed.

Joint Complications.—Nowadays, when a joint is involved in a compound fracture, we treat the joint injury exactly in the same way as we do the fracture only our drainage of the joint should be complete, i. e., through and through, to prevent accumulations in the pockets of the joint of blood and exudate. If infection occurs we resort to fixation, antiseptic irrigation and drainage, and usually the infection can be controlled with a resulting more or less stiff joint.

Primary resection in these cases is sometimes done, but rarely needed. An atypical or partial resection may be good practice, as tending to increase the chances of a useful joint where displaced fragments can result in interference of motion or, if loose, become necrosed.

Amputation.—Amputation is only called for under two conditions: First—When the original injury causes a devitalization of the parts below the fracture. The operation should be done as soon as there is sufficient reaction from shock. Second—When suppuration, necrosis and hectic have resulted, in spite of fixation, drainage and antisepsis, and the vitality of the patient is becoming sapped. Amputation should be done before a "successful operation," but fatal termination follows. —Western Med. Rev.

The Medico-Legal Relations of Traumatic Hysteria.

By Pearce Bailey, M. D.

The group of disordered mental states classed under the term hysteria has left important imprints on history. In the dancing and other manias which swept over Europe in the middle ages; in the obsessions and casting out of devils; in the contagious hallucinatory delirium which has turned convents into Bedlams and which, even in our day, in seasons of religious revival, converts a multitude of simple negroes into a mob of shouting enthusiasts who see visions or have fits—in these as in many other similar demonstrations which are so often interpreted as evidences of the "supernatural," the critical student has found the same abnormal suggestibility, the same defects in the function of special senses, the same delusions or beliefs which are erroneous because the sensations which give rise to them are perverted, as are characteristic of the disease hysteria. It is hardly probable that in the present organization of society, hysteria can assume the menacing proportions that it has had in earlier times among simpler peoples. It is a disease which feeds on credulity and superstition and spreads by imitation. Education is its enemy. But it remains today a disorder of frequent occurrence, which is often misunderstood and oftener maltreated; one of great importance to medicine, with potentialities of great importance to law. Its relations with automatism, with hypnotism, and with abnormal suggestion, with the mirac-

ulous cures which made Lourdes a Mecca or which throw a halo around a Schlatter, render hysteria a disease with which the student of sociological and moral problems, to say nothing of the physician, should be familiar. The present paper concerns itself only with the medico-legal questions which arise when it is the alleged result of negligence. But the understanding of the difficulties which are inherent to that question presupposes some knowledge of the nature of the disease itself. It may be well, therefore, to offer a brief summary of what is now known and believed concerning it.

The indiscriminate use of the words "hysteria" and "hysterical" is undoubtedly responsible for much of the confusion existing in the conceptions regarding the disease. In employing these terms as designations for temporary and unimportant emotional disturbances the fact is easily lost sight of that true hysteria is a definite disease different from any other disease, with characteristic and constant symptoms and with an extremely indefinite prognosis. It is in its latter meaning that hysteria is used in this article. The name itself is a misnomer, as everyone knows. But while its previously supposed pathological connection with the uterus has been proved false, the truly mental nature of the malady is not so generally recognized as it might be. The patients were thought to be poseurs or impostors, or, at best, gross exaggerators; from ceasing to be regarded as a disease of the uterus it has come to be too generally looked upon as not a disease at all. Yet unless the teachings of history, of clinical experience, and of the recent investigations of psychology are wholly at fault, the manifestations of hysteria are entitled to the same consideration and care as are unhesitatingly given to the ravings of mania or to the insane depression of melancholia; and a patient presenting the symptoms of hysteria, although perhaps a silly and attention-loving female, or even a man suing for personal injuries, is none the less the victim of a disorder from which recovery is by no means sure. It is easy to understand why hysteria is often misunderstood and the sufferer from it misjudged. The disease, though essentially mental, finds its most conspicuous expression in physical symptoms which are often perplexingly similar to those caused by diseases of known material basis; and the patient is in general appearance not a lunatic, but a person laboring under some severe bodily infirmity. The most important physical symptoms which hysteria causes are paralysis and defects in the special-sense apparatus of sight, taste, smell, hearing, and common sensibility—so that the patient may seem and believe himself to be paralyzed, or blind, or deaf, or deprived of the use of the other special senses.

These symptoms differ in their mode of origin, in association with each other and with others, from the symptoms due to recognizable injury of the nervous system; but the essential point of difference is that the trouble exists, neither in the sense organs themselves, nor in their direct central connections, nor in the specialized brain regions which have to do with the registration of sensorial impressions. These comparatively simple structures remain normal in their function. The defects are to be sought in far higher spheres; in the neuron systems whch have to do with the collection and elaboration of the products of sensorial impressions; in the domain of higher consciousness and personality in regions whose pathological anatomy is yet to be disclosed. From the failure of the normally transmitted and normally registered sensory simili to be transferred to association systems, hence to enter into the practical life of the individual, they fail to attain an intellectual value, and the patient is in the anomalous condition of feeling, seeing, hearing, tasting, or smelling, as the case may be, without being aware that he does so; or, from similar but more complex causes, he may lose the power of originating voluntary motor impulses and be paralyzed. Yet this belief as to his own incapacity is absolute and often so persistent as to deprive him of his usefulness for considerable periods of time. Since the belief is false, and since false beliefs which dominate and disorganize the life of an individual are insane delusions, hysteria deserves to be classed with the delusional insanities.

That the mental states of hysteria are of essentially functional character is shown by their instability. Under the influence of a suggestion or of an emotion, the clinical picture may undergo a complete transformation, so that the symptoms may be changed in character and situation or may entirely disappear. As an example I may cite a clipping from the news column of a daily paper of December 31, 1898. It is not necessary for me to guarantee the authenticity of the story—true or false, it illustrates the typical workings of the multiform psychosis:

"A clergyman in a Western city lay on a bed in an upper room of his residence yesterday, his features drawn and wasted with great bodily suffering. Around him knelt a group of fellow-pastors, lifting up their voices in earnest prayer, one after another, that God would restore to health and strength and service their brother who had been stricken. The voices were beginning to quiver and tears were flowing freely, when an aged preacher arose from the kneeling circle, walked over to the sufferer, and cried: 'Brother H——, in the name of the Lord Jesus Christ, I bid you rise and walk.' The next moment the stricken pastor lifted himself, placed his feet on the floor, and walked to the door of the room and back

again without suffering the slightest pain. Mr. H—— then dressed himself and began moving around the house. To-day he was without pain and said he would preach in his pulpit on Sunday. Six months ago Mr. H—— was the victim of a bicycle accident. His left leg was badly bruised and kept growing worse. For six months the only rest he has had was from the use of opiates. He could not move without suffering the most excruciating pain. He believes that God answered the fervent prayers of his brother pastors and that the healing is permanent."

Without lingering further on generalities, I shall now proceed to a consideration of certain legal questions as they relate to hysteria, arising from injury or traumatic hysteria. The significance of the word hysteria, as used here, has already been stated. A word is necessary in regard to the qualifying adjective traumatic. It will be used in its broad sense, applying to both physical injury and mental shock. Etymology justifies this extension from the generally accepted significance of the word trauma; and such an extension is essential if the term is to be applied to a disease which may arise from suddenly acting agencies originating outside the body.

Traumatic hysteria has a medico-legal importance, because the disease itself is not rare and because it is particularly liable to lead to litigation. As to the occurrence of the disease, I have come to believe that it is rather frequent. It is true that it is not among the more usual forms of disease in hospital and dispensary practice, but in private practice one meets with it constantly.

During the past fifteen months nine cases have come under my observation in the general course of my practice. Only one of these has been previously referred to.' Two of them dated from elevator accidents, two from injuries (not bullet wounds) received during the recent war, three from accidents on the street, one from a railway collision, and one from a fall from a trolley car. In all but two the physical injuries were insignificant or absent; in these two they were severe enough to cause fractures of one or more bones of the extremities. The diagnosis in each case was made only after a due consideration of the many opportunities of error. It was based upon the character of the accident, upon the association of two or more of the various stigmata of hysteria, and upon the failure of the symptoms to reproduce. by their nature and by their association, the clinical picture of organic disease of the nervous system. Paralysis was present in five cases; anæsthesia, the "barometer of hysteria," according to Janet, the cause of it according to Sollier, distributed differently from the anæsthesia in organic injuries in all; there was a functional contraction of the visual fields in six cases. Convulsive attacks occurred in one case only. Two of the nine patients were army officers; they were the only ones who did not bring claims for damages.

The clinical outline of these cases is given merely as evidence that traumatic hysteria, with pronounced stigmata, is not the curiosity in America that some text books would have us believe. Whatever its place in order of frequency of occurrence as compared with other nervous diseases may be, my experience teaches me that it is among the most frequent which become the subject of litigation. It has characteristics which lead the defendant to suspect fraud or exaggeration; the plaintiff's adviser, on the other hand, either believes in the gravity of the condition or else is confident that the jury will do so; compromise therefore, generally possible in cases of organic injuries, becomes difficult, and the case comes to trial, masquerading under the name of spinal injury, or of concussion of various parts of the nervous system, or paralysis, or what not; rarely in its true guise of traumatic hysteria. Furthermore, the existence of a personal-injury claim furnishes to hysteria, more than to any other disease, the factors best fitted to encourage the patient in the belief in his symptoms and to prevent his recovery. In some diseases, such as neurasthenia, the question of damages seems to be the origination of other symptoms. This is apparently not the case in hysteria. The symptoms often make their appearance before any such question arises. There is, however, good reason to believe that when that question does not enter the symptoms soon disappear, and the disorder, instead of becoming serious, is of short duration.

An important point in connection with the disease is the question of simulation. As has been said, the most prominent feature of the mental state of hysteria is the causation of physical defects which imitate such as result from organic disease. But when it can be shown that the imitation is not perfect, that the symptoms from their inconsistencies and fluctuations could not depend on any known disease of material basis, the question arises, Is the patient feigning, or is he truly unaware that his symptoms are false? Most laymen and many physicians are unwilling to believe in the purely psychical origin of physical defects and deformities. And, indeed, it may be difficult to trust the ingenuousness of a person who may be seen to move a limb alleged to be paralyzed, or who, supposedly insensible on one-half of the body, is not marked by accidental cuts or bruises such as almost unavoidably result from organic anæsthesia. Yet that the mimicry of hysteria is fundamentally unconscious and involuntary is incontestable. The disease has been recognized since

the days of Hippocrates; its symptoms are almost unexceptionally characteristic of hysteria and of nothing else; they have typical modes of development and association, and they occur in a consistent way in persons totally ignorant of medicine, who could not imitate them if they would.

In a large number of cases there is no discoverable motive for simulation. In the cases arising from traumatism such a motive may exist; but it seems to me impossible for any impostor to be sufficiently learned and adroit to simulate the whole hysterical symptom group in a way to deceive a physician who is reasonably skillful and who makes his examination with care; and that the mental state is the only feasible explanation of the apparent inconsistencies in the clinical conduct of a person branded with the stigmata of this peculiar affection.

Both clinical and social factors render traumatic hysteria, when it is the subject of a personal-injury claim, the most difficult of all diseases to be interpreted with judicial fairness. By the methods which at present exist in all states of presenting medical testimony to a jury it is hardly possible for it to be recognized at its true value. Even when every suspicion of dishonesty on the part of witnesses, experts or others, is eliminated, the difficulties standing in the way of arriving at a fair adjustment or verdict are very great. These difficulties arise from three chief sources—first, the lack of precision in knowledge of the hysteria; second, the attitude of physicians who are called upon to testify concerning it; and, third, the attitude of juries toward a disease which is histrionic and exaggerative in its character and whose nature they are unable to understand. As regards the first, the chief medico-legal importance of any disorder alleged to be the result of another's negligence attaches to causation and prognosis. In the causation of all diseases of the nervous system, and especially of those of functional character, predisposition, either hereditary or acquired, plays a most important part. For hysteria, Charcot made a predisposition a sine qua non, teaching that it would not develop unless the nervous system were defective congenitally, or enfeebled by alcoholism, syphilis, the infective fevers, or other exhausting agents. More recent and extended observations show that such predisposing factors cannot be demonstrated with regularity, and that it is by no means rare for cases to present themselves in which the patients, so far as careful inquiry can determine, were healthy men and women until the occurrence of an accident which seems to have been a starting-point of the nervous symptoms. Whatever the psychogenesis of traumatic hysteria may ultimately be shown to be, it cannot for the present be denied that it may be the direct result of an accident, in that had the accident not occurred the patient would never have developed the psychosis. The accidents which are most frequently followed by it are those in which the elements of physical injury and fright are combined. Of these two elements, the mental one is far the most potent. This is shown by the esentially psychic character of the disorder, and is substantiated by a study of the alleged causes of individual cases. The physical element is generally, though not always, very much less in evidence than the mental one—less in evidence than in traumatic neurasthenia. It often amounts to nothing more than such a bruising or shaking up as may result from the sudden stopping of a car, or a rear-end collision by which passengers are not thrown from their seats, or a slight blow. Thus, while it is not intended to imply that hysteria never complicates severe surgical injuries, the general rule is that the evident physical traces of the accident are absent or are limited to slight contusions. It is not probable that any physical injury could be severe enough to be followed by hysteria, unless the element of fright were also present. This is, however, a matter of slight importance. But the unquestioned fact that profound nervous disturbances can result from fright or mental shock alone, when the physical factor is entirely absent, is of great importance, especially in New York State, in view of a recent ruling by the court of appeals. In Mitchell vs. The Rochester Railway Co. (151 N. Y., p. 107) the plaintiff had been badly frightened by the negligent management of a team of horses drawing a street car in Rochester, and the mental shock which she suffered produced unconsciousness and later miscarriage. The court held that the plaintiff could not recover for injuries occasioned by fright, as there was no immediate personal injury. Now, it ill becomes a medical man unversed in law to question the rulings of the supreme court; and I certainly would not permit myself to do so except in so far as purely medical issues were at stake. Therefore, while fully recognizing the wisdom of the foregoing decision so far as the interpretation of law and the general good of society is concerned, it seems to me that the refusal to admit mental shock or fright, when followed by serious symptoms referable to the nervous sytsem, as a cause of action, will result in injustice to many cases of nervous disease, and especially to traumatic hysteria. For in the causation of traumatic hysteria the physical injury is so regularly in the background and so often entirely wanting that, were all the cases in which no physical injury

could be proved debarred from litigation, the result would be contrary to the intention of the law regarding the rights of persons who develop disease as the result of another's negligence.

(*Concluded in next issue.*)

Notices and Reviews.

"Progressive Medicine," a quarterly digest of advances, discoveries and improvements in the medical and surgical sciences. Edited by Hobart Armory Hare, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Octavo: bound in cloth, 490 pages, 28 illustrations and three colored plates. Lea Brothers & Co., Philadelphia and New York.

The initial number of this new publication is at hand. It forms an octavo volume one and one-half inches thick and it will be seen that a few years' accumulation of the volumes will eat up shelf room at a lively rate. On the other hand the volumes are light and easily held.

The topics considered and the space devoted to them are:

Surgery of the Head, Neck and Chest. Edited by J. Chalmers Da Costa of Philadelphia. 82 pages.

Diseases of Children. By A. D. Blackader of Montreal. 109 pages.

Pathology. By Ludvig Hektoen of Chicago. 73 pages.

Infectious Diseases. By Wm. S. Thayer of Baltimore. 118 pages.

Laryngology and Rhinology. By A. Logan Turner of Edinburg. 44 pages.

Otology. By Robert L. Randolph of Baltimore. 38 pages.

Index, 10 pages.

The remaining topics will be distributed among the other volumes.

We fail to see any particular benefit to be derived from publishing the volumes quarterly, for owing to the well-known behavior of inanimate bodies the article sought for will generally be in the part not yet out.. The distinguishing feature of the work is the fact that the department editors have woven the various items into a continued story with running comments of their own. For instance, Dr. Da Costa, in treating of harelip and cleft palate (p. 31), after noting articles by Murray and Munford, gives his own views on the subject, so the text is "a story which bears a personal imprint and will express not only the views of the authors cited, but the opinion of the contributor as well." This will undoubtedly appeal to the "busy practitioner," though some may prefer to have a quantity of opinions and references set forth and do their own thinking.

It is hardly necessary to add that the work is a model of the bookmaker's art. Final judgment must be reserved until the completion of the series for this year.

"A Text Book of Mechano-therapy" (massage and medical gymnastics), by Axel V. Grasstrom, B. S., M. D. Philadelphia: W. B. Saunders. Chicago: W. T. Keener, 1899. Price, $1.00 net.

This little book contains a description of the various maneuvers practiced in the so-called Swedish movement, with chapters on massage and the use of mechano-therapy in various diseases. There is no doubt but that this form of treatment is of great benefit in various chronic disorders and is not used sufficiently. The work may be recommended to those who wish to become acquainted with the principles and practice of this subdivision of therapeutics, for the author, in addition to his extensive experience, has drawn on the works of Thure Brandt, Nils Posse, Douglas Graham and others. Eleven sketches by the author adequately illustrate the various postures and manipulations.

"An American Text Book of Gynæcology, Medical and Surgical, for Practitioners and Students." Edited by J. M. Baldy, M. D. Second Edition, Revised. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. 1898. Price, cloth, $6.00 net.

The second edition of the American text book is presented in the same size and binding as the others of the series, and maintains the general characteristics of the others throughout. The series as a whole is perhaps the most satisfactory set of text books that has ever been presented within the same time. It is, therefore, with special gratification we note that the various volumes are being revised, condensed, amplified and otherwise improved and brought strictly up to date. The list of authors comprises the names of J. M. Baldy, H. T. Byford, E. B. Cragin, the late J. H. Etheridge, W. Goodell, H. A. Kelly, F. Krug, E. G. Montgomery, W. R. Pryor and G. M. Tuttle, and as we glance over this list of eminent men, we invariably give thought to a regret that the individual product of each

is not properly designated. Composite authorship of books is accepted as a necessity in these modern and progressive days, but composite ownership or authorship of articles and opinions is entirely unnecessary, and is quite as unsatisfactory as a composite photograph. As a composite photograph lacks precision and personality, so does a paper of like composition lack character and power.

The pages of this volume teem with valuable information and lack but little of being wholly satisfactory to the reader, but the little which is lacking is in the indefiniteness of the authorship. The character and force which the individuality of an author gives to an article is becoming recognized more and more. In fact, in some quarters the advisability of publishing photographs of authors with papers and certainly as a frontispiece with books is being earnestly advocated and with much reason.

The editor of this large volume has renewed the debt of the profession to him for the uniformly attractive and very readable style in which this large mass of very valuable information is presented. We note a few changes in illustrations, and also in description of details, which have increased the accuracy and value of the book as a whole.

The various subjects are presented in such a full and complete manner that individual mention of the various chapters is uncalled for. Special mention should be made of the use of cuts for the elucidation of the text and especially of methods of examination and treatment to an unusual degree, even to the exclusion of many pictures of specimens which are interesting, but not always instructive.

During the five years since the first edition was printed, operative gynæcology has continued to undergo a most beneficial process of modification, and we may also add improvement. In no publication is this fact more noticeable than in this book, which brings the details of operative procedure up to date, which has necessitated numerous changes in the original text.

This work is the product of the labors of many of our most brilliant operators and most popular teachers, and comprises a thorough and remarkably complete presentation of the pathology, diagnosis and treatment of the various diseases of women, and also the minutest details of the various operative procedures which have been found to be of general value in this somewhat restricted division of general surgery and medicine.

The edition of this one of the series of Text Books by this progressive publisher is deserving of even greater favor than its forerunner, and we have no doubt but that it will be accorded its merited share of the popularity which is common to the whole series.

A. I. B.

PAMPHLETS RECEIVED.

"The Dental Profession in Charity," by Dr. Carl Theodor Gramm of Chicago.

"The Serum Treatment of Diphtheria," by William Cheatham, M. D., of Louisville, Ky.

"The Use of Gloves in Surgery," by W. R. Lockett, M. D., of Philadelphia, Pa.

"Notes on the Absorption versus the Digestion of Milk," by L. Duncan Bulkley, A. M., M. D., of New York City.

"Perichondritis and Necrosis of the Arytenoid Cartilage," by W. Scheppegrell, A. M., M. D., of New Orleans, La.

Notes of Societies.

Association of Southern Railway Surgeons.

Richmond, Va., March 25, 1899.

Dear Doctor:—I have much pleasure in announcing that the executive committee have appointed Richmond, Va., May 29, 1899, as the place and date for holding the fourth annual convention of the Association of Southern Railway Surgeons, with headquarters at the luxurious Jefferson Hotel.

Members of the association and their families will be entertained there at a uniform charge of four dollars per day (the usual five and six dollar per day accommodations). Bathroom for one, two or three persons, occupying the same or adjoining rooms, one dollar per day extra.

Gratuitous use of committee and surgical instrument display room, with a hall for holding the daily sessions, is extended by the management.

Hotel accommodations can also be arranged for as follows:

Murphy's Hotel, corner Eighth and Broad streets: European plan, $1.00 per day for room; American plan, $2.50 per day.

New Ford's Hotel, corner Eleventh and Broad streets: American plan only, $2.00 per day.

The Lexington Hotel, corner Twelfth and

Main streets: American plan only, $2.00 per day.

Electric street cars pass the doors of these hotels about every seven minutes, the Main street cars delivering passengers at the Jefferson Hotel; the Broad street cars, Cary street line, one block away.

And now, my dear doctor, ho for the trysting place! Let there be no laggard in our ranks. "Come and let us reason together." Some can do much—all can do something. Even a good listener is an inspiration to a good talker, and who dare deny that our association is not rich in all classes. We meet for flint-striking. To throw light into unexplored scientific fields, or to illumine the dark side of half-studied subjects, is the object of our gathering. Brightness is born of attrition; therefore let us touch shoulders in the march of progress. I do not believe we need professional Krupp guns to make our meeting detonate. Crystallize your thoughts on some surgical subject (it mattereth little how commonplace), give them a title, and send to Dr. William C. Day, Chairman Program Committee, Danville, Va., as early as practicable. "If it were done, it were well it were done quickly." Your rest will be sweetened by the consciousness of having done what you could.

Faithfully yours, GEORGE ROSS,
President.

Railway Miscellany.

The Hiring and Treatment of Men.

Buffalo & Susquehanna Railroad Company, Galetan, Pa., Feb. 20, 1899.

To the Editors:—The proceedings of the twenty-eighth meeting of the American Society of Railroad Superintendents have just come under my notice.

In reading the discussion of the secretary's report I was particularly struck with the remarks of Mr. E. G. Russell, in regard to promoting brakemen to firemen. Mr. Russell stated he believes in using the greatest care in hiring brakemen, and went on to say, "for that is the blood that is going to make something in the future." He also said that, in his opinion, all head brakemen should be promoted to firemen, and apparently ridiculed the idea of a wiper making a good fireman simply because he learns only the parts of an engine, knowing nothing of transportation.

We all know that care should be exercised in hiring brakemen, or, in fact, any class of railway men, but I think the majority of us have yet to learn that a wiper—selected with the same care as Mr. Russell's brakemen—who has a knowledge of the parts of an engine and the opportunity to make occasional trips as an extra fireman, has not the making of a better fireman and engineer than the brakeman who occasionally throws in a few shovels of coal.

What is the knowledge of transportation referred to by Mr. Russell that a fireman needs and a promoted wiper does not possess—provided he has been called upon to pass the examination called for on all well-managed roads.

Mr. Russell's remarks would lead one to infer that he had viewed the matter from a standpoint best suited to his individual or local requirements. It is hard to believe that he wishes to convey the impression that the backbone of American railways consists pure and simple of brakemen, and that if we use judgment in selecting our brakemen we need have no care for the future in so far as having good material to select from is concerned. The officials of one road I have in mind conceived the idea of taking young men from farms, and, provided they could pass an examination on vision and rules, placing them for two or three weeks with an old fireman, then sending them out by themselves. The result was engines falling down for want of steam. They next favored Mr. Russell's scheme and issued instructions that before hiring new firemen, any brakeman then in the service could, if he desired, be transferred to the mechanical department as fireman. What was the result? The only applicants were dissatisfied and good-for-nothing brakemen, whom the trainmasters were glad to get rid of. The road in question now aims as far as possible to promote roundhouse men and replace those promoted by an intelligent class of men.

During many years of railroading, spent in different countries, I have had the opportunity to investigate methods used in connection with the general make-up of railways, and have come to the conclusion that we have much to learn in this respect. There is not a thinking man but will admit that the rank and file of American railways is too much of a floating element, and that such a condition of affairs is not conducive to the welfare of the men or calculated to make good workmen, and is not in the interest of true economy, in so far as the operation of our railways is concerned.

If we review the work of the past few years it will be found that every advantage has been taken in order to get the most work out of machinery and men at the least possible cost. In order to do this, the men have, in many cases, been placed in the same category as the machines. Leaks in every department have been discovered and stopped, until it seems impossible, on a well-managed road, to suggest any improvement in the method of operating.

One thing, however, we have not done to any appreciable extent. In our haste to economize here, there and everywhere, we have overlooked the fact that the success of a railway cannot be brought about and maintained by one, two or three officials alone. It matters not what position a man holds on a railway, he is a factor in the operation of that railway and must be so considered.

The time is coming and coming rapidly when the question we will have to face is that which older countries have faced and overcome. We have got to make good men; and not only make them, but aim to retain them in the service of one road as much as possible. This can only be done by proving to the men that their interest is to a great extent wrapped up with that of their employers. To do this we must start at the beginning. Our apprentices should be selected from material calculated to make intelligent workmen. Other things being equal, the sons of employes should be taken care of first. Apprentices should be required to work through the pattern shop and drafting room in addition to the workshop. When out of their time we should aim to keep them as workmen.

Wipers should be selected with a view to their fitness for promotion to firemen and engineers, brakemen for the fitness for promotion to conductors. Not only should they be selected with this object in view, but we should see that new men are not hired while men eligible for promotion are in the service. Clerks should be required to work up through the different departments before being appointed to responsible positions in the general office or elsewhere. The snap judgment method of handling men should be stopped. It should not be necessary for intelligent men to hang on to an official's coattail in order to have his abilities recognized and rewarded. Other things being equal, men should be promoted according to seniority. Men should not be hired to fill responsible positions while eligible men are waiting promotion. Habits of thrift should be instilled in the minds of the men. This can be done by the managing officials advocating and helping to form sick and death benefit associations, superannuation funds, etc., in fact, anything calculated to prove to the men that it is to their interest to remain with one railway during their railway life.

The rank and file of our railways need an object to work for, equally with the officials, and the railway which is willing to encourage the men in this respect will receive for its reward economical operation in the true sense of the word. Economical operation that can be maintained without periodically changing the officials will be the result.

J. H. GOODYEAR.

Instructing Employes in "First Aid" Methods.

We have on former occasions called the attention of railway managers to the advisability of having all employes in the train, yard and station service instructed in the methods of giving "first aid" to the injured. It is often unavoidable that some considerable time should elapse after an employe is injured before he can be brought within the reach of proper treatment. During that time he is either neglected, so far as any attempt at remedial measures is concerned, or he is subjected to some well-meant but blundering treatment which is worse than neglect. In many cases a very slight knowledge of correct "first aid" principles on the part of someone in the neighborhood of the injured man and their prompt application would be the saving of his life. In a much larger number of cases it would be the saving of a limb. But there is usually no one in his neighborhood but his fellow employes, and it is in them only that he can hope to find help. In England the instruction of railway men in first aid methods is very general, and the results have been eminently satisfactory. The matter has been taken up in Canada, with excellent promise, as will be seen by reference to an article in The Railway Age of December 9, 1898.

At the last meeting of the surgeons of the C., M. & St. P. Ry. a paper on the subject was read by Dr. John A. Thornton of Lansing, Iowa, and the subject was also discussed at the last meeting of the International Association of Railway Surgeons, and will be given fuller attention at the forthcoming meeting to be held in May, 1899, at Richmond, Va. We believe that it is a matter which is worth consideration on the part of all railway managers.

In handling humanity and its baggage without loss of life or a dollar, Chicago, at but one of its great passenger stations, has made a world-beating record. There were handled by the Union Passenger Station last year 7,500,000 passengers without accident and $50,000,000 worth of baggage without the loss of a single piece. This is the third successive year in which there has been no claim for lost

Personal.

Dr. Louis Thexton has been appointed assistant surgeon for the C. M. & St. P. and Pan Handle railways at Chicago.

Dr. Albert I. Bouffleur has been recently appointed surgeon in charge of the P. C. C. and St. L. (Panhandle) Railway at Chicago, with general supervision over the work at this end of the line.

THE Railway Surgeon

VOL. V. CHICAGO, APRIL 18, 1899. No. 24

PRESIDENT'S ADDRESS.*

BY R. A. PATCHIN, M. D., OF DES MOINES, IOWA.

In addressing the fifth annual meeting of this association I wish to express my sincere thanks for the honor conferred upon me and also to each of the members and officers who, by their assistance in making up the program and by their attendance, have made the session successful. The domain of railroad surgery has come to be distinctively recognized and numbers among its representatives many of the best men of the profession. The railroad surgeon is the product of the times, of an advancing civilization and of the demands of commerce. An epitome of an article in the Scientific American of October 17, 1896. gives the following interesting information.

Years ago, when twenty-five miles an hour was the limit for the fastest trains and when freight trains stopped to rest over night, or to allow trainmen to flirt with the farmers' daughters, but few men were employed and casualties were so few and far between that they were not considered an important item in the management of the property. But with railroad extensions came the increase of employes, and with faster running came the greater opportunity and liability of accident. Then competent means of dealing with such emergencies became necessary and medical departments were established upon various roads. While perhaps the first regular appointment of a railroad surgeon was upon the Lehigh Valley in 1860, the organization of the service was distinctively western in its inception. It was first established on the Central Pacific during the construction of that road by the equipment of a hospital for sick as well as injured employes, all, or nearly all of whom, were away from their homes and in an unsettled country. Under these circumstances attention to their physical needs became imperative. Mr. N. A. Towne, who later became vice-president and manager of the road, established the first railway hospital which ever came into existence, and with it organized a complete service, which, in spite of unfortunate misunderstandings in its management, still exists. It was the success of this venture which lead Dr. J. W. Jackson, then of Sedalia, but later of Kansas City, with whom I had the honor of association in the Wabash service from 1881 to 1887, to establish on the Missouri Pacific and Wabash roads a most excellent hospital system. The magnitude of these enterprises and their continued success attracted the attention of the entire railroad world and gave a wonderful impetus to the study of railway surgery. The entire Gould system, which alone employs over two hundred and fifty surgeons, under the able supervision of Dr. W. B. Outten, the Union Pacific, Denver & Rio Grande, the Cotton Belt and some smaller lines have finely equipped hospitals of their own, while all roads of any pretension in the West and South have a regularly organized surgical service. It is with these that we in this state and in this association have our special relation and interest.

These various services rendered the appointment of many chief, special, district, division and local surgeons necessary. These appointments have been made from the flower of the profession, until there are now connected with the service nearly six thousand surgeons, as compared with a total of only three hundred and forty-eight in the army and navy. This fact alone indicates perhaps more strongly than any other could the importance of this department of the profession.

The need of organization quickly became apparent to the leaders of this army of sur-

*Delivered at the fifth annual session of the Iowa State association of Railway Surgeons, Clinton, Oct. 13, 1898

geons, and its recognition was followed at the suggestion of the lamented Dr. Jackson by the formation of the Wabash Surgical Association. This was the pioneer in the field and was followed by the effort of Dr. Ridenour of Massillon, Ohio, to whom belongs the credit of establishing the National Association of Railway Surgeons, which in twelve years has grown to enormous proportions and to which at its annual sessions has been presented a class of work of which the profession of the world might be proud. Then came another national organization, now only four years old, the American Academy of Railway Surgeons, in which the most brilliant, incisive, keenest observers, as well as the hardest workers, are the leading spirits. Such men as John E. Owens, Fairchild, Galbraith and Cole are among its leaders, and its work is marked by an enthusiasm and unanimity of purpose not excelled by that of any society, equaled by few and worthy of emulation by all. Then in 1894, the lusty infant, who now celebrates its fifth birthday, first opened its eyes upon the professional world. Dr. Warren has the credit of being its nurse and attendant and right well did he direct its first steps. Its growth has been rapid and healthy and bids fair to continue. It is giving to its members the best program and discussion of any of our state societies, and I trust that its present session will prove the best in its history.

As remarked before, railroad surgery and its development is a western product, and one of which the West may well be proud. The systems that have been mentioned and imperfectly described have never been adopted in the East to any great extent. Two years ago, while in New York City, I made some inquiries about the status of railway surgery, and found to my surprise that distinctively it was unknown, and that the term accidental or emergency surgery would describe and embrace it. Since then, however, I learn that the Medico-Legal Society of New York has added a section on railway surgery and is paying to the subject the attention which its importance demands.

The average railway surgeon is a faithful doctor, with rather more than the average share of ability, which becomes developed along this special line as opportunity offers. He has peculiar conditions to deal with and becomes trained to meet all kinds of emergencies, which sometimes are appalling in their magnitude. He should be learned, expert, bold yet cautious, but never timid, positive, emphatic and never vacillating, prompt, ready and willing. He should be always autocratic, yet hiding the hand of iron beneath a velvet glove. There is a vast difference between the demands of railroad work and those of general surgery. In the latter the disease, the patient and surroundings combine to allow the surgeon to fix the time and place for operation and do it at his pleasure. Then after a good night's rest, a warm breakfast and pleasant cigar, he goes with skilled assistants to his patient, whom he finds in a comfortable condition at home or hospital, where with light, air, heat and every appliance that modern science can place at his disposal, he leisurely conducts the operation. But in the former he finds his patient perhaps under the wheels, in mud, snow or ashes, his wounds filled with fragments of torn clothing, crushed bones, dirt, waste, partially masticated tobacco, cold, pulseless, in collapse. Here with no skilled assistant, with no light except from the torch of the engineer or the trainmen's lamp, with cold, benumbed fingers, he has to grapple with the emergency and act quickly upon his own responsibility to save a human life; thus accomplishing the highest object of his profession. Such training does much to develop the man and make of him the highest type of a physician. Such men more than hold their own in all matters pertaining to medicine and surgery. From being brought into frequent connection with wounded employes, who feel that their condition arises from some negligence and consequent blame on part of the employer, the railroad surgeon becomes tactful in the handling of men, and quickly secures the perfect control over sick and injured men that the surgeon should always have. For I believe that the surgeon does the best work and subserves the best interest of the company he represents who has the complete confidence of the employes, who is regarded by them as a friend as well as attendant. He can readily gain this confidence by showing the men that he is honest with them and by respecting their privileged communication, and he in no way prejudices his relations with the company by so doing. The surgeon is employed by the company not because the company is under

any legal obligation to furnish surgical attention in cases of injury, whether caused by its own negligence or otherwise, but for the purpose of minimizing the danger to life and limb of its employes, and because economy of management and humanitarian principles demand in cases of emergency that competent relief be rendered in a systematic, speedy and able manner. So without the delay of fixing liability, the surgeon is immediately sent to the injured person, and the relation of physician and patient is thereby established.

My attention has been called, since I began preparing this paper, to an address entitled the "Surgeon in Court," by Mr. B. B. Osler, Q. C., Toronto, in which the following language occurs: "Now there may be a question as to whom the physician owes his allegiance; to the corporation who employs him, or to the employe, or patient, who accepts his services. The railway surgeon has to bear in mind that there is some difference between his duty to the sick or maimed man, who has been under his care, and that to any ordinary patient. And this arises from the fact that he has not been called in by the sick man or by his relatives, but that he has been sent to see the man as the railway surgeon, paid by the corporation. There is what the lawyers would call no privacy between the patient and doctor. He owes two loyalties, one to the patient and one to the corporation. If he owed it only to the patient, there are many things he ought not to tell." And further: "The courts of this province have decided that when the company engages the surgeon it is entitled to all the information that that relationship gives."

It seems to me that this last sentence means that the company is entitled to know from the surgeon any privileged communication that may be made by the patient to the doctor; that being as I take it, what is meant by the word "privacy," as used by Mr. Osler. This is a position which I cannot understand, and am sorry to suppose it exists either in the Province of Ontario or elsewhere, for I hold that the first duty of the doctor is to his patient and that whenever the relation of physician and patient is once created, no matter by whom, it binds the physician throughout its entire scope and extent. The employe who accepts the service of the railway surgeon has the right to assume that proper professional relations are to be and will be sustained, and that his communications will be privileged as they would be between himself and some other surgeon of his own selection. I think that when both parties, the patient and the company, fully comprehend that this relation exists, that differences, which may arise, in the settlement of claims for injury, may be more readily adjusted in an amicable manner. When justice is all that is sought in such cases courts are apt to be idle.

In a case recently decided by the Court of Appeals in the state of New York the statute which provides as follows: "A person duly authorized to practice physic or surgery shall not be allowed to disclose any information which he acquired in attending a patient in a professional capacity, and which was necessary to enable him to act in that capacity," was fully sustained. The case was one in which a corporation was sued for damages because of an umbilical hernia, alleged to have been produced by the negligence of the defendant. The defendant attempted to show by the physician who had attended the plaintiff in childbirth sometime before the accident that the hernia existed at that time, but the court ruled, and its ruling was sustained, that under the statute such evidence was not allowed. While I consider this bad law in this particular case, the principle is correct, although in extreme cases its object may be perverted.

The position thus taken in no way binds the physician, if he suspects or knows of an attempted fraud to sustain the patient either passively or actively in its perpetration. His personal as well as professional integrity forbids collusion with designing persons. And his attitude, as soon as known, will be thoroughly respected and his influence and opinion will receive proportional credit. It is sometimes a difficult task to discriminate between a real and unconscious simulation of injury in cases where a compensation for damages is claimed. It is too well known that unscrupulous persons feign symptoms of injuries which have never been inflicted, and that in their efforts they are aided and abetted by attorneys and physicians. It must also be conceded that in many cases patients influenced first by the immediate excitement of the accident, and afterward by the examination and inquiries of the doctors, solicitude of friends, representation of in-

terested parties, delude themselves into believing that a degree of injury or disability exists for which they are justly entitled to compensation. The surroundings of such patients tend to keep up and exaggerate the symptoms to an extent over and above that dependent upon the shock of the accident. Such patients may not be in any voluntary sense imposters and yet they will recover speedily after a settlement has been made. In such cases the duty of the surgeon becomes a most delicate one. He may, perhaps, be the family physician as well as the surgeon of the defendant; he listens to the complaint of the patient and to the demand of the claim agent, and is told that when the suit is won his bill will be paid with a handsome honorarium added. He learns that with the ten or more thousand dollars (the prospective judgment) a new wardrobe, a trip to Europe, a liberal education for the children and a new homestead are to be procured, and then the claim agent wants him to say that fifty dollars is ample compensation for all alleged injuries. He learns that Attorney A. does not know anything about law, because he says that there is no case, and that Attorney Z. is a perfectly lovely gentleman, with a profound knowledge of law, and that he shows his intelligence by not charging anything unless he wins the case. To reconcile such patients to a just settlement, which, I am glad to say in my experience, is nearly always offered, is not only difficult but one of the triumphs in the legitimate practice of the railway surgeons. I use the expression "to reconcile the patient to settlement" rather than to make a settlement advisedly.

I do not believe that the doctor should ever make a settlement, or act in any sense as a claim agent. It is his duty as the attending physician to inform the patient or his friends of the real condition. It is his duty as the employe of the corporation to give it the same information, and allow the business transactions to be conducted without his interference. He may approve and should approve a settlement if asked to do so, when in his judgment it is for the benefit of the patient, but it is entirely unprofessional for the doctor to insist upon settlements, and if he does do so, especially if he makes the settlement, it leaves the door always open to the charge that the surgeon gave biased and prejudiced opinions to the party injured as to the extent and permanency of the injuries. Sometimes such cases are reopened and the courts are almost sure to censure the surgeon who has been instrumental in the matter. The surgeon may be and should be of material assistance in the adjustment of claims; he should so qualify himself and become so familiar with the cases submitted to him that he may be looked to for guidance in all disputed claims and his matured judgment given the same weight as that of his legal brother in questions of the law. I think that qualifications to perform this duty will become more and more necessary to the surgeon in the future. When the legal department becomes convinced that the surgical department knows what it is talking about, and that it can formulate a positive and tenable opinion of the condition of an injured claimant, a long advance in the settlement of the claims is made and litigation may be avoided.

It has been my observation that in the last few years in this state fewer cases have been brought to trial, and wishing to verify this I have asked several counsels and claim agents of large companies whether or not litigation has decreased, and, if so, the reasons therefor. The reply has always been in the affirmative, and the decrease has been variously estimated, in some cases as much as fifty per cent. The reasons given for the decrease are also about the same. One reason is the improvement in the appliances of railway operation, which not only diminishes the liability to injury to the employe, but also protects the passengers. With this we have but little to do, but two other principal reasons have close connection with us. The first is complimentary, but I trust none the less true; it is simply that the surgical service is much better than formerly, and a much larger proportion of those who are injured recover without permanent damages, and settlement is consequently much facilitated. The other reason is that there is more disposition on the part of the companies to compromise and pay employes a fair compensation without regard to legal liability to injury. Here it is that the province of the railway surgeon is enlarging and will enlarge; for such compensation must be based upon the amount and permanency of disability, and the determination of this can be only with the surgeon. The surgeon in these cases is a

judge, not an advocate, and while not losing sight of the interests of his employers, he should act in that capacity with due regard to impartial justice. Another reason for the decrease of litigation, given by perhaps the most eminent railroad counsel in the West, is as follows: "Inasmuch as the railway companies have obeyed all the laws passed by our legislature, and are not guilty of any discrimination, there is a better feeling toward the railways and they come more nearly to obtaining justice from juries, thus discouraging the bringing of worthless suits. The meekness and humility of the answer given by this gentlemen, whose conduct of the trial of a case is in no way characterized by such attributes, is testimony to the truth of his statements. Sustaining the statement already made, the Interstate Commerce Commission tells us that during the several years of its existence there has been a steady decrease in railroad casualties, their report ending June 30, 1897, showing a decrease of 2,174 as compared with the previous year. But the junior railroad surgeon need not fear that his occupation is gone, for the same report shows that in that year there were 43,168 casualties, of which 36,731 were injuries of greater or less degree, all of which passed through the hands of the railroad surgeon. As a matter of curiosity in this connection, it may be noted that the mortality in that year was one out of 486 employes and one out of 2,204,708 passengers carried.

Another reason which I had nearly overlooked, and which has great influence in this direction, rests in the employe himself. Think back, those of you who have been in the service ten, or even five, years, and see what a difference there is in the character of the trainmen. Years since these men might have been, and were, of course, fairly capable, and the term "fairly capable" really expresses the situation. The man when once on duty and busy with his train was all right, but it was hard to get him at work sometimes, and he was not as clear-headed on leaving the yards as he should have been. The brightest day in his calendar was pay day, and the darkest one the day after. Being a healthy, rugged individual he suffered more from the effects of indulgence than from the vicissitudes of his employment, and both combined were apt to render his railroad life subject to an abrupt termination, either through the will of God or at the hands of the superintendent. The employe of to-day is far superior to his predecessor physically and mentally. He has a sound mind and sound body and brings to his work an unclouded judgment, which in perilous moments goes far to prevent disaster. That this improvement is due to the persistence of the surgical department in insisting upon a thorough physical examination to determine the fitness of the applicant for the service is a well-established fact. Added to this examination every employe on entering the service should receive some instructions in rendering "first aid" to injured persons. Each shop, each baggage car and every caboose should be supplied with an emergency case, similar to but more extensive than the first aid packets supplied to our soldiers in the Spanish war. Simple yet thorough instructions should be given as to their use, and the keys should be placed in the hands of responsible persons, and any interference with the contents of the box or receptacle, unless in case of injury, should be absolutely forbidden. When a more complete system is reached examinations of all employes at stated intervals should be made and changes made in the service to suit the conditions thus brought forth. This is especially needful as pertaining to the eyes, and perhaps the idea of general physical examination had its origin in the practice of testing the vision for color blindness. Every company should have among its surgeons a competent oculist, whose qualifications should not be confined to the mere matter of asking a man the color of a mass of dirty yarn, but one who is familiar with the use of the ophthalmoscope, who knows the appearance of the interior of a healthy eye, and what a man should be able to see with it. This has its significance not only as regards vision, which is of the utmost importance, but as regards other diseases which are particularly obnoxious to railroad men.

Railroad sanitation has attracted much attention in the societies and journals of late. It has been ably presented in this association by Coit, Fairchild, Kennedy and others and as this paper is becoming too long will receive but passing notice. I am apprehensive, however, that the transportation of thousands of cases of typhoid fever over thousands of miles of road with but little attention to disinfection,

or hygienic precautions will be seriously censured, and I am watching with interest the result of the apparent contamination of the right of way throughout the entire country. Whatever may be the result, I am sure that it will be shown that the medical department has in this, as in every other instance during the late war, done its duty as far as possible with the means afforded it.

I had hoped that I could keep the expert witness out of this paper, but as it nears its close I find him persistently demanding attention. This vexed question has been so continually before the profession and the courts that it has grown tiresome, and seems no nearer solution than before. The attorneys freely express their opinion to the effect that expert testimony is undesirable, yet never allow the opportunity to pass of using it. They suggest that the doctor should be more positive and decisive in his conclusions and answers, and then propound questions to which a categorical answer is impossible. The great fault of the medical man who has not had much experience as a witness (and of some who have) is that he becomes at once a partisan, without regard to the real merit of the case. This is decidedly wrong; the lawyers will attend to the fighting, and the doctor should occupy the same attitude in the examination of the plaintiff, with the view of going into court—and after he goes upon the stand—that he does when called upon to attend his patient in the sick room. If the circumstances of the case are plain enough so there is no possible doubt as to existing conditions, the doctor should say so. If doubt does exist, he should endeavor to ascertain the exact truth, and act, so far as possible, in an unbiased manner. I say so far as possible, for it is hard for anyone who is being paid a fee for his services not to lean, more or less unconsciously, toward the source of his emolument, but his bias should not be shown.

The attorney is expected to show his bias. He is the representative of the company and is striving to win his case and save his client's money, and he is not under oath. The doctor is under oath, and the moment he conveys the impression to the jury that he is a prejudiced witness, that moment much of his influence is destroyed. He should never be loquacious on the stand, and never argumentative. His answer should be as short and positive as possible, never giving an opportunity for a demand for explanation. The attorney is always on the alert, and a careless word may afford the opportunity for him to destroy the effect of much of his testimony. While testimony of this character is severely criticised, I have thought that it is as good and effective as the attorney wishes it to be. The methods of cross-examination on the rules of evidence are such that the attorneys rarely allow the doctors to swear to what they do not want to hear, and I think they are largely to blame for the shortcoming and dereliction of the expert witness. The jury does not understand much that the doctor says, and one or the other of the attorneys takes good care that they shall not be enlightened.

I once heard some very effective testimony, as far as the verdict was concerned, given by a so-called expert witness, who, when asked what the ligamentum patellæ was, replied that he " never could remember them big words." The jury immediately fell in accord with the doctor, and the cross-questioning, which fully established the gross ignorance of the witness, apparently failed to destroy the force of his testimony. This was in a case where a verdict of $5,000 was given to a man who had fallen through a sidewalk in which there was an areaway covered with glass. He sustained a punctured wound below the patella, with some minor bruises. Synovitis and septicæmia developed, brought on by his own carelessness and negligence, and he became suddenly and dangerously ill. A consultation was held, and absolutely no hope was entertained for his recovery. But one of those changes which confound the wisdom of the doctors took place, the patient got well and promptly brought suit, claiming permanent injury to the knee-joint. Before the case came on for trial, the surgeon who had attended the plaintiff through his illness examined him and pronounced the recovery complete. This, of course, did not suit the attorneys or plaintiff. Other doctors were sought, promised a contingent fee and swore positively that the patient was not able to use his knee and never would be. One of these was the person of the unfortunate memory before referred to. The attending surgeon gave his testimony as to the circumstances of the illness, but was not questioned as to the

result of the examination just prior to the trial. The attorney for the defense at once noticed the weak spot and interviewed the surgeon to ascertain the facts; but, with a sense of courtesy and propriety which was highly appreciated, did not put him upon the stand. The verdict was immediately set aside and a new trial was granted without argument and with the least possible formality. Now the point of the case is this: A very few weeks after, the plaintiff, without the knowledge of his attorneys, settled with the defendant for considerably less than $1,000, then claimed a perfect cure by means of Christian science, and now taunts his partisan expert witnesses with lack of knowledge of his case and refuses to pay their contingent fee.

It may be considered that in cases of this kind the witness described was not an expert witness, but, as under the law, doctors are doctors, expert witnesses are expert. The attorney seeks a physician, without regard to his qualifications or reputation, who will upon the witness stand endeavor to substantiate the theory adopted in the prosecution of the case, and this frequently brings discredit upon all medical testimony. Many remedies have been proposed for this condition of things, and a few have been tried, but with no positive result; and the entire matter seems to resolve itself into the general acceptation of the fact that cross-examination of expert witnesses of varying or opposite opinions is the best way to arrive at the truth. In a number of cases of litigation I have deemed it inadvisable for the surgeon of the company to appear upon the witness stand; and, with the consent of the counsel, have submitted the facts to physicians unconnected with the company and asked for their unbiased opinion, and for an examination of the applicant if deemed advisable—using their testimony if expedient, and in any case paying them expert fees for their trouble. This seems to have been, in some cases, a better plan of procedure.

In reviewing this paper I am struck with the fact that it differs very materially from the production which I had hoped to offer. I had considered that perhaps I could present something original upon the subject of railway surgery; but I find that originality is sometimes difficult to produce. This occurs sometimes from lack of ability; sometimes from lack of time, and in the present instance I think that both factors contribute somewhat to the result. I have learned in the past few years that there is much more in railway surgery than the opportunity to procure free transportation. It is a distinct branch of the profession, and is becoming more and more recognized as such each succeeding year. If there is anything in this paper which will lead any railroad surgeon, or the society in general, to think more highly of his work and to elevate the plane of his efforts, my object will have been fully accomplished.

SURGICAL SHOCK.*

By T. W. Nuzum, M. D., Brodhead, Wis.

It has been a common observation from time immemorial that one individual will succumb to a very trivial injury while another, apparently no more strong, or it may be less vigorous, will survive the most shocking mutilation. Perhaps we can all, or many of us, recall cases that suffered most profoundly from shock, or even died from an operation or injury where there was no other cause that could be found either before death or post-mortem. There was no great loss of blood, no septic condition, and yet despite our most strenuous efforts the patient passed silently into the Great Beyond.

This vast difference in individual susceptibility to shock is the measure of one's ability or inability to withstand harmful influences from without. This same difference is found among the lower animals of the same kind, but is more marked in the different species, as, for instance, the cat is proverbially tenacious of life while the hare cannot resist even a feeble blow. Man suffers more intensely than the lower animal, the hysterical person more than the stoical, and the finely tensioned nervous system than the coarse and uncultivated. The mental state also exerts a very marked influence upon a given case, as one who is very angry or greatly excited may not be aware of an injury. And the insane are said to bear pain remarkably well.

The same difference is discernible in all forms of disease, as, for instance, one person

* Read at the sixth annual convention C. M. & St. P. Surgical Association, Chicago, November, 1898.

will combat the tubercle bacillus for twenty or thirty years before he gives up the fight, while another will succumb in six weeks. The power of resistance is something which we are not able to measure with any degree of certainty, and one doctor will say, "this patient can only live a few hours, a few days or a few weeks," and the patient recovers and the friends say, "that doctor doesn't know his business." Or a competitor is called in, and he is wise enough to say little, and gets great credit for "curing the patient whom Dr. C. said would die." The only trouble was Dr. C. could not measure the patient's power of endurance. What we denominate power of resistance, for want of a better term, is an innate quality, hereditary, if you please, and the "Old Family Doctor" learns to lay great stress upon it when making his prognosis in a given case. He also learns his families who are lacking in this quality and is careful not to make too favorable a prognosis even in cases of less gravity.

Shock may be defined as "that condition of general vital depression which marks the immediate effect upon the individual, as a whole, produced by the local wound. The primary constitutional symptoms of a wound."—Am. System of Surgery.

It varies in degree all the way between two wide extremes, from the one in which it is so slight as to be scarcely perceptible to the other where it is so profound as to overwhelm the patient, so that he succumbs more or less speedily without reaction.

The primary effects of shock are produced upon and through the sympathetic nervous system; its most marked secondary effect upon the circulatory system. Severe hæmorrhage and the administering of an anæsthetic may add greatly to the severity of the shock. The mental condition of the patient is an important factor, one of hope and buoyancy being favorable, one of hope and despondency being unfavorable to recovery. Age, too, is not without its influence as those in the extremes of life do not bear shock well. Women are less susceptible to shock than men and one inured to suffering than one that has never been ill nor received an injury.

The pathology of shock is still an undecided question, some authors claiming that it is merely a nervous impression of great severity and leaves no pathological changes. Others that it is a vasomotor paralysis causing dilatation of the large intra-abdominal vessels and a receding of the blood from the brain, heart and cutaneous surface. Others that the injury causes a paralysis of the heart, more or less complete, to which the various phenomena are due. Still others claim to have discovered that the nerve cells themselves undergo structural changes which can be demonstrated microscopically; but be that as it may the rapid, thready and feeble pulse, pinched expression, pale face, cold extremities, shallow, sighing respiration and dilated pupil form a picture of impending dissolution only too familiar to us all; and the all important question is how to bring our patient back to life from that border land of the grave? Reaction is marked by a gradual improvement in all the symptoms, the heart beats stronger, the face returns more nearly to its natural color, breathing is deeper and more regular, the surface resumes its usual warmth or is somewhat febrile and the patient begins to move and turn over, thus showing returning muscular tone.

In the treatment of shock we should avoid the use of those things which are likely to cause or aggravate it, as for instance, ether may be used instead of chloroform, it being less liable to aggravate shock, avoiding exposure to cold, arrest hæmorrhage where that is taking place, and then to put your patient in the most comfortable condition possible. This is done by applying heat externally, wrapping the injured member in sterile gauze and administering morphia and strychnia hypodermically, and if found necessary followed later by subcutaneous injection of a large quantity of normal salt solution. This I believe to be one of the best known methods of stimulation, and to this I would add the rather liberal use of stimulants, as for instance brandy or whisky, and I prefer the former, given per os or per rectum or hypodermically. For notwithstanding liquor has been so severely condemned by many eminent men in the profession, I still believe it to be a useful remedy where indicated, and intelligently used.

Strychnia given hypodermatically and in full doses is a remedy that can always be relied upon, and digitalis, atropia, and nitro-

glycerine given in the same way are many times very helpful.

When the patient is conscious, mental stimulation in the way of encouragement, is markedly beneficial and should never be omitted.

Report of cases: T. S. A boy of eleven years caught his left foot in a wagon wheel and was carried several revolutions with the wheel; when as he was going over he caught hold of a milk can and drew himself on the platform. At that instant his foot became disengaged and he went on home holding his foot in his hands. The head of the tibia was separated from the shaft at the junction of the epiphysis with the shaft. The skin was torn till only four inches remained intact on the anterior surface. The arteries and nerves were not severed, although the foot was numb and pulseless for some days. The lad was suffering so severely from shock that we considered an amputation at that time unwise and as the people were very poor, I administered stimulants as before suggested and reduced the bone to its proper position, carefully stitched the skin and dressed in a semi-flexed position. There was no suppuration, very little sloughing of the skin, and after some weeks firm union, so that now, one year since the time of the accident, the use of the member is so fully restored that he walks with scarcely any limp.

Case No. II.—F. R., aged nine. Was playing "duck" by the side of a railroad track and reached to grab the stone, which they called the duck, from in front of a moving car when his fingers were caught and the soft parts pretty much all crushed from the bones up to near the shoulder, the bones being badly crushed and comminuted. The lad suffered very severely from shock and stimulants and restoratives were applied and six hours later, reaction being well established, we amputated very close to the shoulder point, finding much difficulty in saving enough integment for proper flaps. There was some little sloughing, but the lad made a good recovery.

My aim in writing this paper is not to throw any new light upon this subject, but to bring out thorough discussion, as I deem it one of very great importance and especially to the railroad surgeon, one that is omnipresent, always a source of danger and many times the only danger to life. One with which we should all be familiar as so many times ones success or failure to save life depends upon the immediate and proper application and use of remedies for the relief of shock.

DISCUSSION

Dr. E. H. Bayley of Lake City, Minn.: I think in cases of shock a great deal depends upon the nervous system of the individual. A person who is highly educated will receive more shock than a common laborer would.

In the treatment of shock we should consider the application of heat; keep the individual warm, resort to stimulation, to the use of morphine and strychnia, together with saline injections. These measures are without doubt the most serviceable.

Dr. E. O. Plumbe of Rock Valley, Ia.: I wish to say a word or two regarding saline injections in cases of shock. Some eighteen months ago I was called in consultation to see a case of post-partum hæmorrhage. The patient was almost exsanguinated, so much so that the pulse was hardly perceptible. I injected fully three quarts of normal saline solution, and the consequence was the patient recovered in about an hour and a half. The injections were made into the cellular tissue, but not deeply, with an ordinary hypodermic needle and a piece of rubber tubing. I attribute the recovery of the patient to those injections.

Dr. Nye: I am not a member of the association, but I want to emphasize one or two points. Having occasion to give anæsthetics frequently, I make it a rule never to give an anæsthetic without having a hypodermic at hand, such as strychnia, so that it can be used at once, if necessary. I think we should be prepared at all times for shock, no matter whether it be a small or major operation. Shock kills more patients than we realize.

With reference to the use of saline injections I do not think saline injections come under the head of shock unless we have hæmorrhage. In brief, we should be prepared at all times for shock.

Blows and contusions of the abdomen may give rise to most severe injuries without producing immediate serious symptoms. People have been known to walk for miles after injuries that proved fatal in a short time. Always insist on immediate rest and the recumbent posture.—Int. J. Surg.

TRAUMATISMS OF THE FOOT.*

By A. R. Law, M. D., Madison, Wis.

You will remember when our mutual friend and worthy secretary, Dr. Bouffleur, sent out the first notice of this meeting we were all cordially invited to contribute something (much or little) to assist in making the meeting both interesting and instructive. My first impression was: Now that is a very reasonable and proper request and should be complied with by all the members who, from their experience, can give us "more light" on any subject appertaining to our daily work. My second impression was: Although I have had considerable experience, I can recall nothing that would be worthy of introducing before and occupying the time of the learned body of men whom I would meet at our sixth annual convention. But to convince Dr. Bouffleur that I really meant to "be good," I wrote him, volunteering a few words on "Traumatisms of the Foot."

I intend to occupy only a few minutes of your time, and do not expect to tell you anything more than you already know, so I will content myself with simply calling your attention to the importance of conservatism in all traumatisms, especially in the extremities in cases where amputation seems really necessary. In my experience the good results obtained by strictly conservative surgery (and by conservative surgery I mean to let the parts alone, especially in regard to using the knife) in most of these cases—in otherwise healthy subjects—is most gratifying. Simply watching the wound carefully and keeping it in a healthy and aseptic condition, thereby giving nature an opportunity to repair the injury, which, in a very large percentage of cases, she will do, to the great satisfaction of both patient and attendant, and also to the interest of the railway company, and to verify these conclusions I will give a brief history of a trauma of the foot.

In the evening of October 2, 1897, J. C., an engineer, while pulling a heavy train up a grade near Poynette, got out of the cab and stood on the rear end of the guides, endeavoring to get the sandpipe to let sand down more freely, as it was raining and the track slippery. While thus engaged his foot slipped off onto the main rod and the end of guides. The foot, rod caught his foot and crushed it between the main rod and the forward end of the side from the toes up to the metatarso-phalangeal articulation, was a contused and comminuted mass. The great toe escaped with less injury than the others, although both phalanges were fractured and the soft parts badly lacerated, about two-thirds of the outer part of the little toe was intact and the balance was a shapeless mass. The hæmorrhage was not severe, as you are all aware in such injuries.

Dr. Binnie, of Poynette, who is here with us, gave the foot the first temporary dressing and Mr. C. came on to Madison on his train. That evening I examined the foot, but did not make any material change in the dressing, simply made the patient as comfortable as possible. In the morning Dr. Binnie came over and assisted me in dressing the foot. This was simple and consisted merely in the removal of some foreign substances and fragments of bone that could be removed without further injury to the soft parts; thoroughly cleansing the soft parts with warm sterilized water and washing it off with pure listerine, dusting lightly with iodoform, covering with iodoform gauze, absorbent cotton and roller bandage loosely applied. I went to his house and dressed the foot evey day from October 21st until November 8th. After that date he came to my office and I dressed it every second, third and fourth days until December 1st, and about once a week during December. By January 1, 1898, the parts were entirely healed and he had a fairly good foot in appearance and an almost perfect foot in utility. During the healing process I removed all the balance of the broken phalanges of the second, third and fourth toes and the first and second of the little toe. There was perfect union of the two fractured phalanges of the great toe, and the patient walks now without any limp or halt, attends to his work as engineer, and says the foot gives him no trouble in any way.

I can recall a number of cases in my own practice and also in the practice of brother practitioners where traumatisms were followed by amputations because it was deemed the right and proper and, in fact, the only thing to do, but I am satisfied had they been treated by the conservative surgery of to-day many of

*Read at the sixth annual convention, C. M. & St. P. R. R. Surgeons, Chicago, November, 1898.

them would have recovered and had useful limbs. So, gentlemen, my opinion is:

In all traumas of the extremities (only those where we know beyond a doubt that it is useless to try to save them) give them a fair chance; we can amputate any time, but we can't restore the limb after it is amputated, and in many cases the little assistance you have rendered nature will enable her to bring you returns that will prove a lifelong source of gratification to both the patient and yourself.

TREATMENT OF ASPHYXIA BY DROWNING.*

By H. K. Whitford, M. D., Elgin, Ill.

This paper might appear to be out of place in a meeting of railway surgeons were it not that we are doctors and are expected at all times and in all places to be prepared in advance, to afford the greatest amount of aid in the shortest space of time to the afflicted from all and every cause.

First, I wish to emphasize the fact that there is no water in the lungs of a person when first drowned, as has been so long erroneously taught; therefore, time and effort exerted toward removing it is valuable time and effort wasted.

The fact that few people are restored to life by the means usually employed and recommended, after they have been under water five minutes, is another reason for this paper.

The third reason is our belief that it is possible to restore a drowned person, after they have been under water from thirty to sixty minutes.

Two pathological conditions are present in these cases, spasm of the glottis and capillary congestion. These conditions leads to asphyxia, followed by heart failure, but the patient is not dead until certain changes occur in the blood and tissues.

Treatment: Get the patient in a warm place, remove the outer clothing, and put him in a bathtub, where running hot water can be applied, just below the scalding point. Have a bathtub so constructed that the water can be retained until it covers the patient completely; then have an outlet sufficient to allow the water to pass out as rapidly as it is replenished. Continue this from five to twenty minutes, or until the surface of the body becomes warm; then remove from the throat all mucus or other substance that may have accumulated; draw the tongue forward and have it held, then with the fingers raise the epiglottis, which will be found closed; now commence artificial respiration, by placing the patient on the back with a folded blanket under the shoulders, allowing the head to drop backward. Place yourself at the head, seize the arms near the elbows and sweep them around away from the body, bringing the hands together above the head; return the arms to the side, making a strong pressure against the lower part of the chest. Continue the process until breathing is established.

*Read at the sixth annual convention, C M. & St. P. R. R. Surgeons, Chicago, November, 1898.

Eyesight of Railroad Employes.

The Italian railroads require of their employes both eyes normal in regard to visual acuity, ocular refraction, perception of red and green and visual field. They are reëxamined when they are 45 years of age, when they have been injured or affected with a serious cerebral or infective disease, when they are addicted to the use of tobacco or liquor, or merely suspected of diminished visual faculty. The Monoyer scale, Donder's and Holmgren's are the tests used. The eyes of the candidates for the British navy are not tested until they have been in service for some years, and then not by a medical man. The standard exacted by the English railroads of their employes is only one-quarter of the normal eyesight in the best eye. Parliament is powerless to interfere, as eighty members of the House of Commons are directors of railroads and oppose any reform on account of the expense.—Journal of the American Medical Association.

Never attempt the removal of a needle concealed in the hand or the sole of the foot, without obtaining an X-ray picture beforehand, if possible. It will save many disappointments, as they are exceedingly hard to find. Then, unless impossible for anatomical reasons, make your incision at right angles with the shaft of the needle.—Int. J. Surg.

In the absence of other local anæsthetics, any of the carbonated water in syphons, spurted for a long time over the part, will produce enough insensibility to allow of the painless performance of rapid minor operations, such as the opening of abscesses, etc.—Int. J. Surg.

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RE TRANSPORTATION.

Dr. C. W. P. Brock, chairman of the committee of arrangements, announces that the special train of Pullmans over the Chesapeake & Ohio will leave Cincinnati on the evening of May 29, immediately after the arrival of the trains from Chicago and St. Louis, and will arrive in Richmond the next day at 3:30 p. m.

It is absolutely necessary that the C. & O. should be informed beforehand of everyone intending to come on that train, so as to have the necessary transportation provided. Transportation over the C. & O. will be furnished to all applicants whose request therefor comes in the regular way through their respective managements.

In another column will be found the circular issued by Dr. Middleton of Davenport, chairman of the transportation committee, as well as the replies received thus far, which, it will be noted, are uniformly favorable.

SERO-THERAPY IN CANCER.

In view of the alarming increase in the death rate from cancer, the recent experiments of a French investigator, M. Beretta, are interesting. They were made in the laboratory of M. Charles Richet, professor of physiology in the College of France. Some two years ago MM. Richet and Hericourt, in a communication to the Paris Academy of Sciences, narrated two unusually successful cases which seemed to prove that injections of anti-cancerous serum might sometimes produce a cure or benefit in cases of fibro-sarcoma. The serum was manufactured by triturating the cancerous growth with powdered glass to a pulp; distilled water is then added and after filtration the liquid was placed in a centrifuge and separated into three layers, the middle one containing the cancer juice. This is grayish-red, and, examined microscopically, shows white and red blood cells, fat globules, many broken down cells; also granules rich in nuclear particles. There are many micro-organisms which may be derived from the tumor itself or from contamination during the experiments.

In M. Beretta's experiments the animals used were the horse, ass, and especially the dog. The quantity of juice injected was in proportion to the size of the animal, and the injections were repeated from month to month, tolerance being seemingly established finally. In the horse and ass one or two liters of blood were extracted, but in the dog the animal was killed and the whole of the blood used.

The serum was injected by a hypodermic syringe at some distance from the growth. In a few cases no benefit was observed; in others, although the cancerous cachexia was well marked, pain and swelling were notably diminished. The author gives details of over seventy cases in which the serum treatment was successful in a greater or less degree, and including a variety of growths, among them atrophic mammary scirrhus, cystic mammary

tumors, cancer of the tongue, stomach, uterus and rectum, ulcerated tumor, etc.

The injections are not especially harmful, though as in the use of other serums transient redness, eruptions and fever may manifest themselves. The serum seems to stimulate the organism at large, improving the functions of the body; hence, the general nutrition. The ulcerations start up the healing process, necrotic tissue is thrown off and the growths generally are softened and reduced in size. The use of the serum does not, however, prevent the development of new areas of cancer cells. In a very few cases no beneficial effect is observed; in some others an apparent cessation of benefit from the serum is followed by renewed action after a few weeks' interval. While no unquestionable cure of a cancer has been reported so far, yet, as the London Lancet remarks, "It is certainly useful in controlling such symptoms as pain, œdema and hæmorrhage, in reducing the size of tumors and in improving the aspect of ulcers."

Translations.

A Case of Incomplete Fracture of the Humerus.

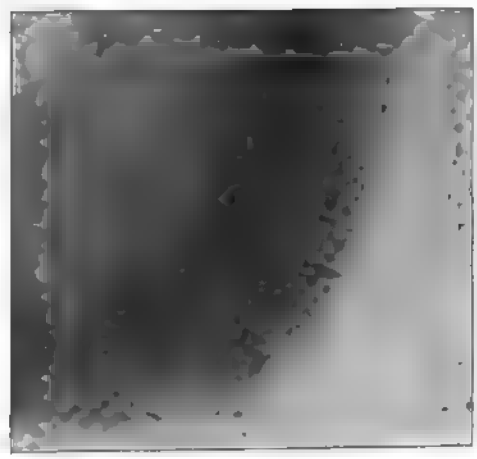
By Dr. H. Verneuil of Brussels.

(Continued from page 550.)

I did not see the patient again for a month. Massage had been made regularly, the swelling was rapidly absorbed, passive movements —even very extended—were supported without any pain, active motion was painful and restrained and extension of the wrist could not be made. It was for the latter that the patient was re-examined; there was manifest radial paralysis. Palpation showed that the elbow-joint was intact, but that the lower part of the arm was the seat of a deeply situated induration, as though the humerus was hypertrophied. This was evidently the cause of the radial paralysis, but what was the matter with the bone? It had not been fractured, an inflammatory lesion was out of the question and it was only by radiography that the uncertainty was cleared up.

The accompanying radiograph shows an abnormal curve of the bone, the concavity corresponding to its inner surface; on the outer face the bone has splintered and a bony fragment is partly detached. It is the end of this fragment that we felt through the tissues. Is the lesion of the radial nerve primary? Was it divided at the time of the fracture or had it undergone compression by the callus? The total paralysis and the location of the fracture incline us toward the former hypothesis.

The most interesting point, however, is to ascertain why the fracture was not complete; in other words, by what mechanism it was produced. To understand this let us recall the position of the arm against the wall. It was in contact from its lower end nearly to the outer end, where it was pressed down by the weight of the shoulder and neighboring parts. Hence, a force acting against the humerus could not exert itself save on a very



INCOMPLETE FRACTURE OF HUMERUS.

short segment of the bone. Nevertheless the pressure of the wheel ended by breaking the humerus at a point directly opposite where the pressure was greatest. Under such conditions the fracture should have been complete, but what happened in this particular case? After the humerus was fractured on the external face its position with relation to the wall was changed, and the insignificant space which separated the patient's arm from the wall disappeared and the arm was supported, not by its two ends, but by its whole length. So that the pressure which was at first exerted against the humerus was then exerted against the wall through the interposition of the bone before the latter was fractured completely. This interpretation seems to be the only rational explanation.

As we have previously stated, incomplete

fractures of the long bones are noted as excessively rare. There are a few cases in medical literature of inflexions of the femur and of the bones in the forearm and leg. We have found nothing concerning the humerus in the adult. But it is certain that this rarety is only relative, for some incomplete fractures may exist without giving rise to any serious symptoms; again, there must be others not yet published and probably many errors in diagnosis and interpretation were committed before the days of radiography.—(Ann. Soc. Belge de Chirurgie, vi-321.)

Miscellany.

Transportation to Richmond.

International Association of Railway Surgeons.

Committee on Transportation, Wm. D. Middleton, Chairman, Surgeon in Chief C., R. I. & P. Ry.

Davenport, Ia., April 14, 1899.

Dear Sir:—The annual meeting of the International Association of Railway Surgeons will be held at Richmond, Va., on May 30 and 31 and June 1, 1899. The management of the Chesapeake & Ohio Railway has tendered the association a special train from Cincinnati to Richmond to take the members of the association to the convention. The management of the C., C., C. & St. L. Railway has also agreed, if there are a sufficient number of members going from either Chicago or St. Louis to warrant it, to run a special train from one or other of those points to Cincinnati, to connect with the special on the Chesapeake & Ohio.

We wish to ask you to extend to the members of the association the courtesies which have been generally extended to them by the railways of the country in former years, viz:

1. To honor requests from the proper officers of other companies for transportation for surgeons in the employ of those companies over your lines, as may be required, either to point of connection with the lines above mentioned, or to Richmond.

2. To make the necessary requests on the managers of other lines for similar transportation for such surgeons of your own company as may desire to attend.

It is understood that this request applies to transportation for the members of the association only, in whose behalf the application will be made by the proper officer of their employing company, and not for any member of their families.

Hoping to receive your favorable reply, I am, yours truly,

WM. D. MIDDLETON,
(For the Committee.)

ANN ARBOR RAILROAD.

This company will issue and request transportation after the manner and under the conditions set forth in your circular.—H. W. Ashley, general manager.

BALTIMORE & OHIO SOUTHWESTERN.

It will be agreeable to us to honor requests from proper officials for transportation of their surgeons and also request passes for our own surgeons.—J. Robinson, receiver.

BURLINGTON, CEDAR RAPIDS & NORTHERN.

This company will apply for and respond to requests from general managers of other lines for transportation. Applications should be addressed to Mr. Robert Williams, vice-president, Cedar Rapids, Ia.—W. P. Brady, general agent.

BURLINGTON & MISSOURI RIVER.

We shall be glad to arrange in accordance with our previous custom to honor requests made in the regular way by proper officials of our connections.—G. W. Heedreger, general manager.

CHICAGO & ALTON.

We will honor requests for transportation of your members when signed by the president, vice-president, general manager or general superintendent of the line—J. K. Wood, assistant to general manager.

CHICAGO GREAT WESTERN.

We shall be glad to comply with your request.—S. C. Stickney, general manager.

CHICAGO, ROCK ISLAND & PACIFIC.

I doubt not we shall feel like honoring the applications from other railway companies who may request transportation for their surgeons—H. A. Parker, vice-president and general manager.

CHICAGO, BURLINGTON & NORTHERN.

Shall be pleased to furnish transportation for delegates of your association upon request from proper officer of road in whose employ they are.—J. R. Hastings, general superintendent.

CHICAGO & EASTERN ILLINOIS.

We will, as in former years, honor requests from the proper officers of other companies for the transportation of surgeons who may be obliged to use our line in going to and from the meeting.—M. J. Carpenter, president.

CINCINNATI, NEW ORLEANS & TEXAS.

We will comply with your request in reference to transportation for surgeons at-

tending the meeting to be held in Richmond. —S. M. Felton, receiver.

CLEVELAND, CANTON & SOUTHERN.

We shall treat the matter same as usual. Very few, however, will use our line beyond our own surgeons.—J. W. Wardwell, receiver.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.

We will issue transportation for surgeons who desire to attend the meeting at Richmond, upon request of the managing officers of their lines, and will arrange for through transportation for our surgeons to that point. —C. E. Schaff, general manager.

CLEVELAND, LORAIN & WHEELING.

This company will be pleased to honor all requests for transportation, and will ask for same over other lines for our surgeons.—W. P. Woodford, general manager.

FALL BROOK.

Will be glad to honor requests from proper officers for transportation of railway surgeons.—John Moyer, president.

FLINT & PERE MARQUETTE.

We should be very glad to issue transportation to any railroad surgeons attending your convention upon receipt of requisition from the proper officer.—S. T. Crapo, general manager.

IOWA CENTRAL.

I will be pleased to issue transportation for surgeons of other companies, and will make necessary requests for transportation of our own surgeons.—L. M. Martin, general manager.

KEOKUK & WESTERN.

I will honor requests from proper officers of all railroads who wish to use our line—A. G. Goodrich, vice-president and general manager.

LAKE ERIE & WESTERN.

The L. E. & W. and C. A. & C. Co.'s will comply with the requests made.—Geo. L. Bradbury, general manager.

MISSOURI KANSAS & TEXAS.

It will be our pleasure to honor requests from the proper officers for transportation, account of surgeons, and to request similar transportation for our own surgeons. It is understood your request applies to members of the association only, and not for any member of their families.—A. A. Allen, vice-president and general manager.

NEW YORK, CHICAGO & ST. LOUIS.

Will honor requests made by proper officials for surgeons en route to convention and make necessary request for our own surgeons, but not their families in either case.—W. H. Canniff, president.

NORTHERN PACIFIC.

As in the past we shall be very glad to honor requests from proper officials. It is not our custom, however, to request transportation on foreign lines for surgeons along our line, not exclusively engaged by our company.—J. W. Kendrick, second vice-president.

PITTSBURG, BESSEMER & LAKE ERIE.

We will be very glad to honor requests from proper officials of other companies, and to make necessary requests for transportation of our own surgeons.—F. E. House, general superintendent.

ST. LOUIS SOUTHWESTERN.

I shall be very glad to furnish transportation to delegates attending the meeting of your association.—R. Harding, vice-president and general manager.

TOLEDO & OHIO CENTRAL.

Our company will be pleased to grant transportation upon proper request and to make such request for our own surgeons.—J. M. Ferris, general manager.

UNION PACIFIC.

We will take pleasure in issuing transportation to surgeons providing they are bona fide employes and requests come from chief operating official of their road.—E. Dickinson, general manager.

WABASH RAILROAD.

We will be glad to honor requests of other lines for transportation, and will also make requests for our own surgeons.—J. Ramsey Jr., vice-president and general manager.

WISCONSIN CENTRAL.

We will issue transportation over our line for any member of the association upon request of the proper officer and will also make application for our own surgeons.—H. F. Whitcomb, general manager.

Never close a scalp wound unless all dirt is or can be removed.—Fenwick.

Remember that in the operation for the removal of fragments which have been pressing on the brain is rarely complete, spiculæ being left behind.—Fenwick.

Do not hesitate to trephine if the skull cap is exposed, if there are definite signs of localized paralysis and if there is no suspicion of general pyæmic infection.—Fenwick.

Do not mistake the depressed center of an extravasated blood clot or congenital malformation or atrophy for depressed fracture or the sutures for a line at fracture.—Fenwick.

Extracts and Abstracts.

The Medico-Legal Relations of Traumatic Hysteria.

By Pearce Bailey, M. D.

[*Continued from page 559.*]

The difficulties encountered in trying to fix upon a definite cause for traumatic hysteria are equaled by those met with when it becomes a question of prognosis. No disease presents so few guiding marks by which the probable outcome may be speculated upon. Hysteria may be cured over night, so that the patient becomes and remains as well as he ever was. On the other hand, it may remain as a distressing and disabling infirmity for ten or twenty years, or, indeed, a lifetime. The prospects of recovery depend almost wholly upon the future environment of the individual; and the physician is as unable to tell what that is to be as he is, in the majority of cases, to control it. It is commonly said of traumatic hysteria that the sufferer from it, as soon as he gets his money, suffers no more. While nothing in the nature of the disease, which is characterized by sudden fluctuations from mental impressions, would permit one to deny this statement, experience shows that it is by no means always true; that many patients are absolutely oblivious to the question of damages; and that the disease drags on after the legal proceedings have ceased to do so. So that the most that can be said regarding the prospects of recovery in any case of traumatic hysteria is that the disease is in no sense incurable, and that, if proper management of the patient is possible, it could in all probability be cured. There is, however, no more reason for a medical expert in a litigated case, when he knows little or nothing of the circumstances of the plaintiff, to say, as is sometimes done, that the symptoms will disappear "like the snowfall in the river" when the case is finished, than there is for the expert on the other side to testify that the patient is "ruined for life."

Having thus glanced at the uncertainties which are inherent to traumatic hysteria and which become especially conspicuous in litigation, it is now necessary to look for a moment at the way this complex and many-sided disease is regarded by the medical profession in America. In regard to it physicians may be divided into two classes—into those who are familiar with it and those who are not. The first class is restricted. It includes only those who have a certain amount of knowledge of the constitutent parts of the nervous system, of their actions in health and of the defects which result when they are diseased or destroyed. Hysteria is a functional disease par excellence, and the diagnosis of a functional affection can be arrived at only by a process of observation, criticism and rejection. The ability to recognize a functional disease presupposes a familiarity with the symptoms of organic disease. Such a familiarity is obtained only by interest, opportunity and study exerted in neurological fields. To know that a true foot clonus, rhythmical, forcible and persistent, is rarely if ever observed in hysteria; that a seeming paralysis of the face may be due to an hysterical contracture of opposing muscles; that in the anæsthesia of hysterical paraplegia the genitals escape; that in anæsthetic areas the reflexes may be lost; that unilateral hysterical symptoms are four times out of five on the left side—to know these and scores of others of the peculiar attributes of the psychosis is essential for anyone who is to give an interpretation of a given case; but the possession of such knowledge and the ability to utilize it implies an appreciation of the necessity of thoroughness in the examination of nervous cases, a familiarity with technical methods, and above all a familiarity with the symptoms which point unerringly to demonstrable breaks in connecting paths or lesions in nerve cells. This is especially the case for hysteria induced by trauma. In the non-traumatic variety the psychosis is chameleon in the gorgeousness and changeability of its colorings; seen at the acme of its variations, the most uninitiated could hardly fail to identify it. But traumatic hysteria so often manifests only the somber hues, so often reveals itself, not by the classic shriekings, gesticulations, exaggerations and similar efforts at display, but only by a persistent paralysis or anæsthesia or depressed, inattentive and apparently unresponsive mental state, that its identity escapes the perception of whoever is not on the alert for the points of difference which distinguish the peculiar mental malady from those disease pictures which it so closely resembles, yet from which it is so totally distinct. If the preceding statements are true —and I think they would be pronounced to be so by those best qualified to judge—it follows as an immediate consequence that medical expert testimony in regard to hysteria or any of the traumatic affections it may simulate, to be of value either in a scientific or judicial way, must be given by someone familiar with nervous diseases. When given by someone who is not so qualified, it almost unavoidably follows that the hysterical symptoms are mistaken for manifestations of organic and, generally speaking, incurable disease—that the patient is made to appear in a much more hopeless state than he really is.

Unless my own experience, slight as it is, has

been unusual, and unless the information derived from other sources has been misleading, a large number of the medical witnesses who qualify as experts in litigated cases of traumatic hysteria have no rational conception of what hysteria is and are totally unfitted to give an expert opinion in regard to it. Although such witnesses may be distinguished in their profession, and their expressed views may be honest convictions, they are none the less fatal to all attempts to arrive at the truth of the question at issue.

The third, and perhaps the greatest obstacle to traumatic hysteria being justly dealt with in court is constituted by juries. In the negotiations which take place between the injured person and the responsible party soon after the accident there are so many legal and economic considerations, in addition to the purely medical ones, that it is hardly worth while to speak of the difficulties of settlement in traumatic hysteria. But when a case is finally brought to court, to the "tribunal to which all citizens may repair with confidence that their contentions will receive rational and impartial consideration," it remains to be ascertained, after the liability of the defendant is established, what the nature, degree and probability of permanency of the injuries are and the amount of financial compensation to which the plaintiff is entitled by them. These are the questions which the jury has to decide. Under existing conditions, it is almost impossible for a jury to decide them with discernment. The plaintiff is generally brought before it, and he is almost sure to present the acme of all the symptoms he has had. If some of the symptoms had disappeared, they will probably return at the trial. Sollier records the case of a lady who as the sequence of an assault developed, among various other hysterical stigmata, a left hemi-anæsthesia. This disappeared, but at the time of the prosecution of her assailant, some two years later, it returned again.

The psychosis is nourished upon suggestion and introspection, means for which are so profusely furnished by the excitement and observation attendant upon court proceedings. It is entirely consistent with its nature that existing symptoms should become worse or vanished ones return on such occasions. It is not necessary to assume, in explanation, any voluntary exaggeration or simulation on the part of the patient. The effect of this clinical idiosyncrasy on a jury, however, is disastrous to the cause of the defendant. The twelve jurors have heard from the medical experts of the two sides testimony too often directly conflicting. On the one side the opinion has been expressed that the patient's condition is due simply to nervousness aggravated, if not caused, by the suit, and that the symptoms will soon subside when the legal proceedings are at an end; on the other side, the belief has been sworn to that the injury is of organic and irreparable character, or else, if perchance its functional nature is admitted, that the nervous system has sustained a shock from which it can never recover.

The jurors may be convinced of the honesty of all the views they have heard expressed, and yet they are unable to determine from the character of the testimony which of the opposing opinions is the more likely to be correct. They are, therefore, obliged to rely upon the impression made upon them by the injured person himself. They see a person in an even worse condition, perhaps, than his doctors had depicted. They see an alleged paralyzed limb absolutely motionless; they become witnesses of an emotional outburst more harrowing than any related in the evidence. And they see these things one or two years after the accident has occurred. Their natural inference is that the injuries are permanent. They find it hard to believe that the outlook for a malady which has so long defied the resources of medical skill is anything but hopeless. They are unwilling, if not unable, to believe in the unreality of the physical symptoms. They cannot comprehend a part being the seat of paralysis or insensibility unless there is some grave physical defect behind it; they do not know that a limb which is immobile to-day may be in wonted activity to-morow. Thrown on their own resources by the contradiction in medical testimony, they render a verdict in accordance with their own impressions as to the plaintiff's injury. Their impression is that of a person severely and probably incurably injured; and their verdict, rendered accordingly, is generally in excess of anything to which the plaintiff is entitled.

What has now been said is an essay to outline the difficulties, many of which seem unavoidable, in the litigation of a most obscure and capricious disease. No attempt has been made to take into account the many side issues. The dishonesty on the part of witnesses, the subtleties of points of law, prejudice, and similar considerations, are no different in the litigation of hysteria than in other diseases and are, furthermore, questions which do not concern the medical man. It should not be the object of everyone who sees obstacles in the path of truth to do what he can to remove them, and it is a cause of regret to the present writer that he has no remedy to offer. The question is one which must find its solution with the progress of civilization. When there has been provided a more efficacious means of arriving at trustworthy medical testimony, hysteria will benefit more than other disease. When medical education is more

thorough, and especially when graduates are not permitted to leave the medical schools until they are familiar with the more important facts known in regard to nervous structures and functions, the benefit to the general medical profession cannot fail to be felt in the courts.—Med. Record.

Reduction of an Old Dislocation of the Elbow Joint.

By William L. Rodman, A. M., M. D.

This case is an old dislocation of the elbow joint. The history is as follows: A boy, 13 years of age, while wrestling with an older lad, was thrown and caught himself upon his hand; he felt as if he had sustained some injury of the elbow joint, and he suffered considerable pain. Examination was made under chloroform, and the diagnosis was made of a sprain, no fracture or dislocation could be made out. There was considerable swelling for some days after the accident, and a second examination did not reveal any other trouble.

An examination yesterday convinced us that there is not only a dislocation, but a complete one of both bones of the forearm. My own opinion is based upon a very beautiful skiagraph made by my assistant, Mr. Dunn. I am glad to learn that Professor Holloway has recently been lecturing to you on injuries to the elbow joint, and he has, doubtless, described many of the lesions which may occur. You can have a dislocation of both bones backward, as in this case, and, strange as it may seem to you, you may have a dislocation of both bones forward. You can also have a dislocation of both bones externally, or a dislocation of the radius alone, backwards, forwards, or externally, but it cannot be dislocated internally on account of its attachment to the ulna; and you may have a dislocation of the ulna backward.

This is one of the most difficult joints to treat, whether the trouble be fracture or dislocation, and elbow joint dislocations undoubtedly give more trouble and cause more chagrin to the surgeon than lesions of any other joint in the body. Therefore in these cases one should be most careful and guarded in making a diagnosis or prognosis. An anæsthetic should always be used for diagnosis. Swelling after lesions of the forearm is rapid and great, and on account of this swelling you will often be in doubt unless an anæsthetic is given. Therefore I enjoin upon you in all cases of injury about the elbow joint, whether you are satisfied with your diagnosis or not, to give an anæsthetic and make certain that you are right. You can then not only make a more accurate diagnosis, but you can also reduce the fracture or the dislocation more readily on account of the relaxed condition of the muscles.

There is another feature about dislocations of the elbow joint. You may make an error of diagnosis in a dislocation of the shoulder joint, and even after two or three weeks there will be no trouble in getting the bone back in place. Unfortunately this is not true of the elbow-joint. I have never seen an unreduced dislocation of the elbow joint that could be reduced after three weeks had elapsed. I have seen some of the most distinguished surgeons make repeated efforts to do this, yet I have never on any occasion seen an elbow joint dislocation reduced after the third week. Therefore authorities speak of this joint particularly as one where the dislocations become old or chronic very soon. The shoulder joint and the hip joint are so situated that you can reduce dislocations three, six or twelve months after the injury. The reason why dislocations of the elbow joint become chronic or old in so short a time is usually due to this fact: The bone comes back as in this case; the periosare thorwn out between the olecranon process is bound down by adhesions to the posterior surface of the humerus; true bony adhesions are thrown out between the olecranon process below and the posterior surface of the humerus above, and it is so difficult to break these adhesions that you will invariably fail after the joint has been out of place for a short time.

We propose to-day to perform an operation such as will give this boy a useful arm. We will put him thoroughly under the influence of an anæsthetic; then make attempts to reduce the joint without an opening or converting a simple into a compound dislocation; if we do not succeed in getting the bones back in place by the ordinary measures, then we will resort to cutting into the joint, and forcibly press the bones into position if we can. This boy is young, and it would seem altogether wrong to allow him to go on through life a helpless cripple. Therefore we feel not only justified in opening into the joint, but we also feel satisfied that we shall obtain good results. After doing this, it is quite possible that we may have an ankylosed joint; but if he has an ankylosed joint, his arm will be in such position that he will have the greatest possible use of it (of course in its present position it would be almost absolutely useless), at right angles with the hand, midway between pronation and supination. This is the very best position in which you can have the elbow joint if it is going to be permanently stiff. A person with the hand in that position can button his collar, can put on his clothes and button them without difficulty, etc., whereas with a stiff elbow joint with the hand extended it is practically useless.

What are the ordinary methods of reducing a dislocation of the elbow joint? Simply ex-

tension and counter-extension will be all that is required in the majority of cases, but the old-fashioned way of taking the elbow over your knee, as I show you, is not a bad one. It brings the bones into good position. You use the knee as a fulcrum, then force the bones into position by making extension. This is a very good plan, but I have always succeeded by extension and counter-extension in effecting reduction in acute cases. I have seen the tendon of the triceps cut by the elder Gross and other distinguished surgeons, and never have I seen the bones reduced if the dislocation has existed for two weeks or more. Cutting the triceps will do no good, because the trouble is not with the muscles; it is due to adhesions between the olecranon process and the lower surface of the humerus.

The boy has now been anæsthetized, and by manipulating his arm you will observe the very limited motion we get. We will now make extension and counter-extension and see if we can reduce the dislocation. You see how difficult it is to reduce a dislocation of this kind, and you can also understand why it was not reduced even under chloroform on a former occasion by the family physician. Anyone may fail to get the bones back into position in a case of this kind. I have seen the best surgeons fail to do it, and in this case it was not the fault of the family physician that he failed to reduce the dislocation. I am using all the force that I feel justified in doing, and am satisfied that reduction cannot be accomplished.

We have now tried for fifteen minutes, faithfully, earnestly, scientifically, under complete anæsthesia, with three of us working on the case, to reduce the dislocation, and we have made no impression upon it. We shall now apply an Esmarch bandage, and then make an incision into the joint and a complete reduction in that way. There are different ways of making incision into the joint; you can go in upon either side, or you may go in posteriorly. I prefer the latter plan, as I believe it is the better one. I shall make a straight incision over the posterior aspect of the joint just as if I were going to reset the elbow joint. We will go straight down over the posterior surface of the olecranon, and the incision will be found four inches in length, so the upper one-half will be over the posterior surface of the humerus, the lower one-half over the posterior surface of the ulna. This will give us very good access to the joint and dislocated bones. We will cut down and separate the fibers of the triceps, then we shall detach the triceps from the olecranon, turning the flap to either side down to the periosteum, then after separating the adhesions between the olecranon and the posterior surface of the humerus, we will make an effort to replace the displaced bones. I hope we shall succeed. This procedure is quite a modern one, and under aseptic precautions I believe it is not only justifiable, but not to do it in the present case would fall short of doing our duty to the patient. There is not a great deal of danger in opening the joint at the present day. Formerly, however, the operation was attended by grave dangers; we now go into joints with the same impunity that we do the abdominal cavity, the brain, etc. I have never had ankylosis or suppuration follow an arthrotomy or arthrectomy, nor do I anticipate any trouble in this case.

In making our incision posteriorly we are away from all the important nerves except the ulnar. It is a very easy matter to cut the ulnar nerve in doing a resection or even an arthrotomy; the ulnar nerve, you will remember, passes down between the internal condyle and the olecranon process, and this is a point you must avoid in doing an operation upon the joint when your incision is made posteriorly. If you make an incision too far over toward the radial side you must be careful lest you go to the posterior interosseous nerve. If an incision were made anteriorly, of course there would be danger of injury to the musculospiral nerve, the median, and the large blood vessels.

I am cutting through the fibers of the triceps and separating them from the periosteum; we now dissect down the periosteum and all the fibers of the triceps; remember there is something more than an insertion of the triceps into the olecranon; it is inserted into the fascia of the forearm, which must not be sacrificed. I make a second incision over the head of the radius, and we at once come down upon it in its abnormal position. We shall be careful not to do harm to the tendon of the biceps, which, as you know, is inserted into the tuberosity of the radius. The coronoid process has been lifted entirely out of its fossa. I find that it can be reduced, but it again slips out. The olecranon has ruptured the ligament entirely so that the bone slips up on the outside. The adhesions are so firm that I shall separate them by means of a small chisel, after which we will reduce the head of the bone.

The question that comes up in my mind now is whether we shall attempt to get future usefulness of the joint, or put it in a condition for permanent ankylosis. Considering all the circumstances, although the injury to the structures about the elbow are rather extensive, I will make an attempt to get a useful joint. The adhesions between the olecranon process and the posterior surface of the humerus have been chiseled away, and we have now succeeded in reducing the dislocation. The olecranon depression into which the olecranon process fits in the humerus was abso-

lutely filled with inflammatory and adventitious material; the olecranon process could not sink down into the olecranon depression on account of this fact. The adventitious material has been curetted away and now the bones are in perfect position. Even after getting rid of the adhesions I had some trouble in lifting the coronoid process over the end of the humerus, but by taking an elevator and forcing it over, while extension was being made, we succeeded in getting it into good position.

We have completed the operation with very little injury to the soft parts. I think it would be best for us to dress this arm straight for the present. The bones being in perfect position we will now remove the Esmarch bandage. I have saved the periosteum; we will make firm gauze pressure to stop all hemorrhage, then bring over the flaps of the periosteum and fibers of the triceps, and I think we will get a useful joint. A question of importance that comes up here is how the fibers of the triceps should be sutured, whether it is better to put in a permanent suture or one that will remain for several weeks, or whether it would be best to put in a suture of silkworm gut going down to the periosteum and taking them out in a week. Owing to the fact that in this joint we desire to get the greatest possible latitude in the way of motion, the latter plan seems the most favorable. We will use silkworm gut, going down through all tissues, and let them stay there for a week or ten days and by that time I think the tendon, periosteum and muscle will have united without trouble. We will insert a small drainage tube into the lower angle of the wound. All hemorrhage has been arrested by gauze pressure, and we will now proceed to close the wound. Upon second thought, I believe we will practice drainage with a strand of iodoform gauze instead of a rubber tube. Exposure of the bone has been done sub-periosteally, but the periosteum has not been destroyed, therefore it is brought together without difficulty. In closing the wound my sutures are carried down to the bone, as those of you who can see the procedure will observe. I lift up the periosteum, including all the tissues, and take a good deep stitch so as to maintain the parts in perfect apposition, using as the suture material strong silkworm gut.—Pediatrics.

In amputations, remember that the muscles will retract much more in traumatic cases than in limbs long affected by disease, in which there has been atrophy from lack of function. —Int. J. Surg.

Beware of using dry iodoform gauze in a septic cavity. It cannot act as a drain unless it is constantly kept wet. Use the plain sterilized or the bichloride gauze, under a dressing kept wet by rubber protective.—Int. J. Surg.

Traumatic Ventral Hernia.

By J. B. Blake, M. D.

The following two cases, admitted to the First Surgical Service of the Boston City Hospital, seemed of sufficient interest to report and comment upon. Both were injuries of the abdominal parietes, following immediately upon trauma. The second case is reported by permission of Dr. H. W. Cushing.

Case I.—J. C., thirty years old, a teamster, was admitted to the City Hospital January 10, 1898. He was seen by the writer about 7:30 p. m., shortly after his admission, who found him perfectly conscious lying upon the accident table. He gave the following history: At 1 p. m. that afternoon, while unloading a team, he slipped from the wagon and struck on the end of a crowbar, which he was using. One end of the bar was on the ground, and he fell upon the blunt upper extremity. He then fell upon his back in the street. He was not stunned. The pipe which he had in his mouth did not fall, nor did it break, and the man continued smoking. He put his hand to his side, under his clothes, and not finding any blood, concluded that his abdomen was only scraped. He climbed into his team and was driven to his room on Emerald street. Unassisted he went up three flights of stairs to his room, stripped and went to bed. He then noticed for the first time a small amount of blood on his shirt, and a wound just above his right groin, from which a yellow mass about two inches long protruded. He sent for a physician, who happened to be out; another physician came and examined him, covered the protruding mass with gauze and sent him to the hospital. His overalls, pants and drawers were torn cleanly at the level of the wound.

When first seen, six and one-half hours after the accident, he was rather pale, perfectly conscious, not excited nor in pain, temperature 100 degrees, pulse 70. He had not had vomiting, hiccough or other symptoms. Examination showed a strongly built man, whose abdomen on the right side was marked by a transverse gaping wound, one inch long, just above and a little outside the external abdominal ring. A small amount of straw-colored serum was escaping from it. The house surgeon told me that nothing protruded from the wound when he first saw it, an hour before, but that there was a soft swelling just above the wound which partially disappeared on manipulation and during the cleansing and shaving preparatory to operation. There was some question at this time whether the patient really saw anything protruding from the wound. His story after the operation was much more definite than before.

The site of the operation was again carefully cleansed with 1 to 6,000 corrosive sub-

limate, the nozzle being gradually introduced into the wound, which ran upward and outward toward the anterior superior spine. The skin was then incised and the wound was found to be three inches long and superficial to the external oblique aponeurosis. At the upper end a bit of omentum, about the size of the terminal phalanx of the thumb, was found protruding through the fleshy belly of the external oblique. It was not wounded nor strangulated, but several black hairs, apparently pubic, were found scattered over it. About three inches more of omentum were easily pulled out, bringing with it a few more hairs and a little more serum, but no blood nor turbid fluid, no sign of intestinal contents. It was washed with salt solution and replaced, and some salt solution put into the abdominal cavity. The finger introduced did not find signs of any abnormal condition. The wound seemed to be a splitting apart of the fibers of the muscles—rather than a clean cut—and resembled somewhat McBurney's incision wound for appendicitis. It was just below the level of the anterior superior spine and about one and a half inches above Poupart's ligament. It was packed lightly with iodoform gauze and the skin incision sutured; baked dressing and swathe. For two or three days there was considerable abdominal distention which was relieved by a high enema, and for a week it was impossible to move the bowels except by enema. The pulse and the expression of the face were always good. Packing removed on the third day, bringing with it a small amount of clotted blood; otherwise uneventful recovery. Discharged February 18th. He did not return to work until the end of March and then began his old occupation of teamster and has worked regularly since, without symptoms referred to the site of injury.

When last seen, about ten days ago, the operation wound was a firm line scar, which does not bulge more than the other side of the abdomen when patient coughs. He wears a padded canvas swathe. On looking him over, the results of several other accidents were discovered. On his forehead is a long scar, and the tips of the second and third left digits are missing—the result of an encounter with a hay cutter, for which he says he was treated twenty-five years ago by Dr. J. G. Blake. On the left leg is a broad purple scar, one inch long, just below and behind the head of the fibula, where he was struck, since he left the hospital in February, by a bullet accidentally fired into the street. He may be said to have suffered many things from many men, and to have recovered from them all rather better than might have been expected.

Case II entered the hospital on December 3, 1897. He was thirty-eight years old, and gave a history which seemed entirely inconsistent with the injuries which he presented. No amount of questioning or cross-questioning, however, could elicit from him any variation in this story, which was, that four days before entrance, while endeavoring to jump across a small brook, he slipped and struck heavily upon his right side, particularly upon the right side of his abdomen. The fall caused him some pain, but he walked home unassisted and went to bed. Next day he noticed a swelling of the right side of the abdomen, larger than the fist, painful and tender. He did not notice whether it increased in size upon coughing. He was sent to the hospital by a physician, and came in an electric car.

The man was above medium size and strongly built. A systolic murmur was heard at the cardiac apex. This murmur was not transmitted to the axilla. Cardiac hypertrophy was not present. On the right side of the abdomen, just below the ribs and extending into the flank, was a swelling which obliterated the natural contour of the waist. It was not discolored, was slightly tender and slightly dull upon light percussion.

There was also an ecchymosis covering the perineum from coccyx to scrotum, and another ecchymosis over the posterior part of thigh, just above the popliteal space.

The finger-nails were short and broken, and the finger-tips hard, discolored and contused, with a certain amount of blood under the skin. He did not present symptoms referred to either the peritoneal cavity of the alimentary tract. Except that he was sore and bruised, he was comparatively comfortable. It was considered that operation might be necessary, and he was prepared for it. A moist dressing of corrosive sublimate was placed over the abdomen and a tight swathe applied; he was given a diet of meat broths.

The swelling, which seemed to be in the abdominal wall, slowly subsided; ten days after entrance it had practically disappeared, leaving a hard edge, somewhat like the crater of an absorbing hæmatoma. The ecchymosis on thigh and perineum cleared up, he was allowed to have his clothes, and was about to be discharged when it was discovered that the subcutaneous crater-like edge was apparently more distinct than before, and that on coughing nearly the whole of that side of the right abdomen which is covered by the muscular belly of the external oblique bulged outward to an extraordinary degree; it was as if a considerable portion of the abdominal contents was pushed through the wall and presented immediately under the skin. The rounded edge extended from a little above the level of the umbilicus, at the outer edge of the rectus downward and outward in a curve, to be lost below the anterior superior spine of the ilium. This part of the wall was softer than the rest, and bulged a little even when the

patient was breathing naturally. After careful examination the diagnosis was made of rupture of parts of one or more muscles of the abdominal wall, and a consequent traumatic ventral hernia (though it must be said, while in the minds of some of the surgeons this diagnosis was only provisional, to the writer it seemed absolute).

Patient was again put to bed, and developed incidentally a mild tonsillitis. As the condition of the abdomen did not change and the patient was a laboring man, and this seemed to be a disabling injury, operation was advised, requested by the patient, and performed by Dr. Cushing about three weeks after the original injury.

An incision was made through skin and superficial fascia, in the direction of the fibres of the external oblique, beginning about one and one-half inches inside, and sloping above anterior superior spine, and going to edge of rectus. Fibers of the external oblique were carefully laid bare, and no laceration could be discovered, either of the muscular belly or of the aponeurosis. The external oblique was split and the internal laid bare. This was also intact. The sheath of the rectus was nicked, and the muscle found to be normal. The only positive condition suggesting the injury discovered was a certain thickening along the edge of the rectus in the aponeurosis of the external oblique, corresponding to the crater-like edge above mentioned, which the writer had taken to be the contracted edges of the ruptured muscular fibers.

The wound was closed, layer by layer, with catgut, and the skin by buried catgut suture. The result was uneventful healing by first intention, and a faint line scar. Three weeks after operation there was still bulging on moderate coughing, though less than before. About this time the patient was examined by Dr. Knapp, who found that the muscles seemed to react normally to the electric currents, but required distinctly stronger currents than upon the other side. On February 7th he was discharged to the Nervous Out-Patient Department, to which he returned several times, and during which time he improved steadily but slowly. Since the middle of February he has been lost sight of, and in spite of all efforts, no trace of him can be discovered.

According to the usual definition, a ventral hernia is one appearing at a part of the abdominal wall where no opening or point of diminished resistance normally exists. A traumatic hernia is one which results from accident or operation, regardless of situation. The post-operative herniæ which are extremely common form a distinct class by themselves, and will not be considered in this brief paper.

Given a perforated wound of the abdominal wall, and the protrusion of viscera through it, the surgeon is confronted by four principal sources of danger: (1) hæmorrhage; (2) injury, often laceration, occasionally strangulation of the protruding viscera or of the abdominal contents; (3) infection of peritoneal cavity; (4) resultant weakness of abdominal parietes.

From a moderately extensive examination of the literature it would seem that cases of traumatic ventral hernia are not often considered of sufficient importance to report, and when reported are classified under a variety of headings. The number of references is comparatively small, though the condition itself is not uncommon. Probably the first case recorded is found in Roman history, and occurred during the pugilistic contest. The contestants were exchanging alternate blows. One insisted that the other should place his fist above his head and while in this defenseless position drove his hand through the opponent's abdominal muscles and tore out his entrails. The judges awarded the laurel wreath to the dying man. This episode has been immortalized by two of Canova's well-known statues.

Coming to more modern times, in 54 cases of stab wounds and penetrating wounds of the abdomen found in the recent records of the Boston City Hospital, hernia was present in 12 (about 22 per cent.).

Traumatic ventral hernia may follow gunshot wounds, stab wounds or perforating wounds made by blunt instruments, or direct violence, as in the cases recorded.

Hernia following gunshot wounds is extremely rare. Otis found but two cases reported to the surgeon-general during the Civil War. Conner says this is probably less than the actual number of cases which occurred and reports one more case; and Patzki, in 1872, reported a single case (omentum presenting, not touched till eighth day, then cut off with wire ecraseur without opening abdomen. Recovery). The indications at present in this condition would be immediate laparotomy, the hernia being entirely secondary in importance to the probability of injury to the viscera.

Hernia following sword or bayonet wounds is so rare as to have almost escaped mention in war reports.

The wounds most frequently followed by hernia are knife wounds (cuts or stabs) and wounds caused by falling upon broken glass or upon sharp instruments. They vary in size from a fraction of an inch to a foot or more. Hunter reports case of a girl eight years old, who fell while carrying a whisky bottle. The wound was only three-fourths by one-half inch, yet the entire stomach was found outside the abdominal wall. The case recovered. Caine and Cuff report cases illustrating the other extreme, in which two men slashed themselves with razors, one vertically, the other horizontally. In both cases the

stomach, almost the entire small intestine, the colon and the omentum were found outside the abdominal parietes, yet both recovered. Clark reports a five-inch knife wound, in which the entire small intestine, colon and omentum protruded, and the omentum was found covered with shavings; the man recovered and was well three years later. Frank describes a case of multiple stab wounds, which occurred in Vienna, in which omentum presented from one wound, and gut, which was wounded, from the other. Recovery. Finally, Mitra describes a very unusual case, that of a Hindu who was suffering from marked ascites, and who slipped and fell to the floor after getting out of bed. He ruptured his abdominal wall above the umbilicus, small intestine protruded; and was also ruptured completely across the circumference; it was cleaned and stitched to the abdominal wall in situ, forming a double artificial anus. This case died.

(1) Hæmorrhage in these cases will depend on the position and size of the wound. In several reported instances the hæmorrhage was extremely severe, and was from the deep epigastric, the internal mammary or the circumflex iliac. In the case referred to above, in which the abdomen was cut transversely from one anterior superior spine to the other, both deep epigastric arteries were severed and the patient was pulseless. All four ends were tied and a quart of hot salt solution (temperature 108 degrees) was put into the median basilic vein, followed by a pint of coffee by rectum. This energetic treatment saved the man's life. The difficulty frequently found in these abdominal wounds is that the severed vessels contract into their sheaths; the incision should be enlarged, if necessary, and the vessel picked up and tied. Heat is of extreme value in these cases.

(2) Laceration of protruding gut should be closed by Lembert sutures. In the few cases in which this is not possible an artificial anus may be made.

Strangulation, or incarceration, is relieved by enlarging the incision.

(3) Infection may be introduced into the peritoneal cavity at the time of the accident, or afterward. It may be due to material from outside, or to the contents of wounded viscera. It is the most serious of the dangers with which the surgeon is confronted, for it is present in greater or less degree in every case.

If the intestine is wounded, after the rupture is closed the peritoneal cavity should be irrigated thoroughly and drained, according to the majority of writers. But cases of recovery are reported in which the abdominal wound was sewed up tight. If the intestine is not wounded it should be most thoroughly cleansed and then returned; and the same is true of the omentum, save that in cases in which a small amount of omentum has been exposed for some hours it is probably better to tie and cut it off.

The length of time intervening between accident and operation has a most important bearing upon infection; the longer this interval, the greater the necessity of drainage. Frank, of Vienna, insists particularly upon drainage in every case where there is any injury of any viscus, and advocates cleansing the peritoneal cavity by gauze sponges entirely without irrigation. Infection is frequently absent where it might be most expected. Dr. Brough reports a case of a sailor stabbed by a case-knife in the hand of a comrade at sea. Gut and omentum portruded. The captain washed the protruding viscera in water from the cask, pushed it back and sewed up the wound with a sailmaker's needle and thread. When Dr. Brough saw the case, ten days later, the man was well and sitting up, and had not had any symptoms of infection.

(4) Resultant weakness of the abdominal walls is greatest in extensive wounds and in wounds which are drained. Its dangers are slight when compared to infection, and it should be allowed to exert only a secondary influence upon the choice of treatment of the wound.

The hernia consists most frequently of omentum; then come small intestines, large intestine or stomach in the order named, or two or more of these may appear together. The hernia may immediately follow the trauma, or a varying interval may elapse before it appears. In these delayed instances the protrusion is usually due to vomiting, muscular exertion, or both. In several instances men have run, walked or rode some distance before realizing that they have been wounded.

The most important rule in operating is to begin at the earliest moment after the accident. The next most important is the thorough cleansing of all exposed viscera before operating. In the majority of cases the incision should be enlarged, usually in the direction of the original wound unless this would involve one of the larger arteries. Torn or dirty edges of the wounds should be resected. Stasis of the bowels frequently follows operation, and is probably due to a mild degree of peritonitis. It may be treated by immediate and repeated small doses of calomel (one-tenth to one-fourth grain every hour till movement, or ten doses) and high enemata. Reboul recommends ice on the abdomen as a preventive of inflammation.

The diet should be meat broths. The drainage may be removed on the third to fifth day.

The prognosis in cases in which the viscera

is not wounded is good. Only one report of death has been found in cases of this variety.

(*Concluded in next issue.*)

Notes of Societies.

The ninth annual meeting of the Central of Georgia Railway Surgeons' Association convened in Macon Tuesday, April 18, in the parlors of the Hotel Lanier.

Dr. W. H. Elliott, chief surgeon, is permanent president of the association and presided over the convention. The following was the program for the meeting:

Prayer.

Morning session, 10 o'clock.

Reading minutes of previous meeting.

"Hip-joint Amputation, with Report of Three Successful Cases," Dr. Hunter F. Cooper, Atlanta, Ga. Discussion.

"Double Amputation Through the Tarsus," Dr. J. A. Goggans, Alexander City, Ala. Discussion.

"Chloride of Sodium as an Antiseptic Solution," Dr. A. K. Bell, Madison, Ga. Discussion.

"Drainage for Contused and Lacerated Wounds," Dr. Samuel C. Benedict, Athens, Ga. Discussion.

"Color Blindness in Railway Employes," Dr. R. F. Harper, Ozark, Ala. Discussion.

General remarks to the association, Dr. W. H. Elliott, Savannah, Ga.

Afternoon session, 3 o'clock.

"Longitudinal Fracture of Femur," Dr. W. B. Prather, Seale, Ala. Discussion.

"Treatment of Fractures," Dr. James B. Morgan, Augusta, Ga. Discussion.

"Shock, and Its Treatment," Dr. W. D. Travis, Covington, Ga. Discussion.

"The Need of Stretchers in Railway Service," Dr. George C. Trimble, East Point, Ga. Discussion.

"A Peculiar Care of Railway Injury," Dr. Henry A. Jones, Millen, Ga. Discussion.

Necrology. Miscellaneous business. Treasurer's report. Election of vice-president and treasurer.

The Association of German Railway Surgeons will hold its annual meeting this year at Nuremberg on September 12th.

General Manager Kruttschnitt of the Southern Pacific has issued orders to have all the apostrophes and plurals dropped from stations of the Pacific system that are named after individuals. This is to be done for the sake of uniformity, brevity and preservation of the name originally intended.

Personal.

Dr. W. M. Rhea of Larned, Kan., died there on April 4 from dropsy. The doctor was for many years local surgeon of the Sante Fe.

Dr. S. E. Cook, editor of the Western Medical Review, Lincoln, Neb., has recently been appointed oculist to the Burlington system in Nebraska.

Dr. T. H. Briggs of Battle Creek, Mich., died on April 7. He was an ex-president of the county medical society, a member of the I. A. R. S. and A. M. A.

Mrs. Hattie Vandervort, wife of Dr. F. C. Vandervort, local surgeon of the Illinois Central at Bloomington, Ill., died at her home in that city on April 10, from pneumonia. For several years past she had attended the annual meetings and was looking forward to a visit to Richmond.

Dr. H. C. Young of Bloomfield, Iowa, died on March 17, 1899, aged 58. He was a member of the Western Surgical Association, also of the Wabash Surgeons' Association, of which he was vice-president, and was a member of the Des Moines Valley Medical Association, of which he was at one time president.

Drs. Jas. T. Jelks (Surgeon Missouri Pacific) and Holland, editors of the Hot Springs Medical Journal, opened the Ozark Sanatorium, Hot Springs, Ark., March 15th, for the reception of patients.

The building is four stories high, with hydraulic elevator. It has bathtubs on each floor, and in addition a large bathroom in the basement. It has a government hot water privilege, and the sanitary and hygienic arrangements of the building are perfect. It has a well-appointed surgical department, fitted up with the latest appliances, the operating room of which has been constructed with great care and has not a superior in the West. The sanatorium building is surrounded by verandas, and has large grounds, beautifully shaded with forest trees, affording ample opportunity for fresh air and exercise. Trained nurses are in attendance, and the institution is in charge of a matron.

Persistent pain over the seat of an old fracture is nearly always benefited by the internal use of iodide of potassium, with the application of iodine or a mercurial ointment externally at the seat of the pain.—Int. J. Surg.

In wounds of the liver use gauze packing to stop the hæmorrhage. It is safer than suture, and decidedly more effective than the application of the cautery.—Int. J. Surg.

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TWO CASES OF TRAUMATIC SURGERY.*

BY IRA K. GARDNER, M. D., NEW HAMPTON, IOWA.

The first case I wish to report is a penetrating wound of the rectum. There are two reasons which induce me to report this case. First, it was a fatal one, and, second, I can find scarcely any literature in any of the text or reference books on surgery giving even a brief mention of the subject. I have consulted fifteen authors who have written works on surgery and in only two instances have I found the subject of penetrating wounds of the rectum referred to in any manner. I find this omission more noticeable in works that have been written in the last ten or twelve years.

In Gross' "System of Surgery" I find the best and fullest account of these wounds of any of the works which I have consulted. Notwithstanding the fact that Dr. Gross lived and wrote before the days of aseptic and antiseptic surgery, together with the almost innumerable changes in technique which modern surgery teaches, one will find more wheat and less chaff in Gross than will be found in many of the more modern works.

On July 15, 1898, a stout, healthy and vigorous young man, age 24, single, was engaged in unloading hay with a horse hay fork. While operating the hay fork he in some manner accidently backed off the load and was impaled on the handle of an ordinary pitchfork which he had previously let slide from the load of hay. The pitchfork was leaning against the hay with the tines on the ground. The upper end of the handle entered the anus, passing deeply into the rectum. The tines were driven far into the ground, the body of the patient swayed to and fro for an instant on the end of the handle, when it broke near its middle, allowing him to fall to the ground. The pain the patient endured for the first few minutes was exquisite.

On examination after the accident, it was found that the skin surrounding the anus was considerably lacerated. The tonicity of the sphincters was lost. On deeper examination, as far as the examining finger could penetrate, the mucous membrane of the rectum, on its posterior aspect, was lacerated, but it could not be positively determined that the laceration extended through all the other coats of the bowel. The hæmorrhage was slight. At this time, twelve hours after the accident, aside from slight pain at the anal opening, there was considerable pain in the right iliac region; also flatness on percussion at this same point. Pulse 90, temperature 99. Gently irrigated the lower bowel with warm sterilized water and introduced a moderate sized strip of iodoform gauze in rectum, dusted anal opening with iodoform, finishing with compress of gauze, absorbent cotton and "T" bandage.

Fearing there might possible be a perforation somewhere in the lower portion of the colon, or at least that the trauma had been sufficiently extensive to have greatly weakened the wall of the intestine, it was deemed expedient to lock up the bowels with opium. Calomel was given in fractional and repeated doses. Liquid diet was ordered. Temperature, pulse and his general condition remained the same on the second day. On the third day noticed tympanites. Pulse 96, temperature 101.5. Fourth day, pulse 120, temperature 102 2-5. Gave increased doses of calomel, together with sulphate of magnesia, followed by rectal injection, which caused a painless movement of the bowels in the evening. The tympanites, which had become quite excessive, was greatly reduced. Once a day since the accident a warm boric acid solution had been

*Read at the sixth annual meeting C., M. & St P. R. R. Surgeons, Chicago, November 1898

used in the rectum and fresh dressings, as described above, re-applied.

The general peritonitis which had been gradually extending day by day, after the movements of the bowels at the end of the fourth day, apparently had nearly subsided. At this time temperature was 99 1-10, pulse 90; no nausea. A restricted liquid diet with small doses of calomel and salines were ordered for the fifth day. On this day, which was ushered in so auspicuously, and promised so much for the patient, which gave warrant to the belief that a certain and complete recovery was almost assured, an unlooked-for change occurred at 3 p. m. A sudden and violent chill came on, followed by subnormal temperature, collapse and death in about ten hours. No post-mortem could be obtained. I could only infer that perforation had taken place.

All of the authorities which I have been able to consult are silent on the question as to the advisability of making an abdominal section with a view of fully ascertaining the extent and nature of the traumatism, and resorting to such surgical procedure as the conditions indicated. It is true, I have not found a case mentioned which has occurred since the days of antisepticism.

My chief, indeed my only, reason for reporting this case, is to make it a matter of record and to ascertain by the discussion, which I hope will be free, if some other plan of treatment would have promised better results. In Kelsey's work on "The Rectum and Anus" I find that Esmarch has reported four cases of rectal wound, attended with much local trouble, in which recovery resulted. Chornel reports two fatal cases. Velpeau mentions eight cases, six of which ended fatally. Kelsey points out that "wounds of the rectum are generally the result of accidents, and perhaps the most frequent cause of such an injury is the perforation of the bowel with an enema tube, a bougie, or a urethral sound." In Holmes' "System of Surgery" mention is made of a specimen in Guy's Hospital Museum of a portion of a rectum perforated by a bougie. An attempt had been made to introduce a bougie, producing a perforation, death ensuing in ten hours. "In another case the same injury was inflicted by the introduction of a rectal tube. The wound was about five inches from the anus. A man aged sixty years was the subject of strangulated hernia. It was supposed to be reduced, but the symptoms of strangulation continuing a rectal bougie was passed. Collapse and death followed. After death the rectum was found perforated, as the preparation shows."

As previously remarked, after a patient and prolonged search in text and reference works and medical journal literature, I find so few cases mentioned that I was desirous of placing this fatal case on record.

Last February I was hastily summoned to attend a young lady twenty-six years old who had been shot with a No. .32 cartridge, long, fired at short range—the distance being about six feet. The wound of entrance was on the right side, three and one-half inches below the nipple and about four inches to the right of the median line, between the seventh and eighth rib. One hour after the injury her condition was as follows: Pulse 90, respiration 20; no temperature; no evidence of shock or internal hæmorrhage. The only pain complained of was at the lower end of the ensiform cartilage; also on a line drawn from this cartilage to the wound of entrance. No probe was inserted in the wound. No attempt was made to ascertain, by its use, whether the ball had entered either the thoracic or abdominal cavities or both, although we were fully conscious of the importance of making this differential diagnosis. Giving due consideration to the short range the bullet had to travel and the direction with which it impinged on the body, notwithstanding the almost complete absence of any symptoms that the patient had been much hurt, it was believed the wound was a penetrating one.

In The Railway Surgeon for October 18, I find this significant paragraph with reference to the differential diagnosis between penetrating and non-penetrating gunshot wounds of the abdomen. Dr. Hugh M. Taylor asks:

"Are we able, with any degree of certainty, to differentiate between the penetrating and non-penetrating gunshot wounds of the abdomen? In the absence of the rare evidences furnished by the protrusion of the abdominal viscera or their contents, we can only ascertain positively of the existence or non-existence of penetration by a careful dissection along the tubular wound track through the abdominal wall." This conclusion, Taylor says, not only

accords with his own experience, "but is in keeping with the progressive surgical thought of the day." He further asks: "Are we justified in all instances on finding a perforation of the abdominal wall, and in the absence of symptoms of visceral lesions, in opening up the abdomen to examine its contents?" He continues by stating that he agrees with the majority of surgeons in thinking an exploration is called for in all cases, because of the fact that we know of no symptom or chain of symptoms by which we can discover beyond all question the extent of the intraperitoneal injury."

Inasmuch as there was almost a complete absence of symptoms of a severe injury, it was useless to propose for celiotomy. Consequently an antiseptic dressing was applied and perfect quietude enjoined. The next day, about twelve hours after the injury, well-marked icterus was observed, which deepened for about twelve hours and then disappeared, scarcely being noticeable twenty-four hours from its first appearance. At this time, twelve hours after the injury, her pulse was 132, temperature 103, respiration 41; slight vomiting; no blood in matter vomited, and no tympanites. Celiotomy was proposed but refused. The next two days the symptoms remained very much the same as the second day. On the evening of the fourth day she became restless and passed a night of distress, and on the morning of the fifth day we found her sinking and she died at about noon, five days from the receipt of the injury. The treatment was symptomatic and expectant. Rest, opium. laxatives, supportive and enemas.

Thus the poor girl died. Likewise we were in doubt as to the extent of the injury which had been done to the solid or hollow viscera. It was inferred that no intra-abdominal hæmorrhage had taken place, or at least if any, it was insignificant.

Considering the location of the pain immediately after the shooting, which was, as has been described, under the margin of the ribs on the right side; also the jaundice which made its appearance about twelve hours after the accident, it was determined with some degree of certainty that the liver had been wounded. It was also considered probable that the stomach had escaped injury, inasmuch as bloody matter had not been vomited and there was an absence of shock. But beyond these opinions, which were expressed with some hesitancy, we were not willing to differentiate more explicitly.

The shot having been fired by a murderer, the majesty of the law was invoked, which gave me an opportunity to complete my provisional ante-mortem diagnosis. The autopsy was made by direction of the coroner twelve hours after death.

An attempt was first made to pass a probe along the track which the bullet had made, but without success. No kind of probe, large or small, straight or curved, could be introduced much beyond the depth of the skin, although a patient and persistent attempt was made, thus illustrating the impossibility of passing a probe during life, where the bullet has penetrated the thoracic or abdominal cavities, going through different anatomical structures at an acute angle.

The track was then carefully dissected and the wound of entrance to the right pleural cavity was found to be between the seventh and eighth ribs, about four inches to the right of the median line. The lung was not wounded.

In the lower part of the pleural cavity, about four ounces of bile were found, walled off by a roof of well organized lymph. The bile was extended through a small hole in the diaphragm, which the bullet had made. Directly under this opening in the diaphragm the ball entered the liver about three inches from the middle line and four inches posterior to the anterior border, passing nearly horizontally to the left, emerging near the median line. The wound was three and one-half inches long and one and one-half inches below the surface at its deepest point. In the upper portion of the abdomen, inclosing the wound of entrance, was another sac of lymph, containing about five or six ounces of bile. Splitting open the track in the liver, a patch of cloth about one inch square was found. This track was lined with lymph. These pockets of bile, walled off by exudations of lymph and adhesive inflammatory action, very beautifully illustrates how well nature had done her part to protect the system against further damage by the absorption of the biliary secretion. This walling off process also explains why the jaundice disappeared a few hours after the accident. I will briefly trace the further course of the ball.

After emerging from the liver it was deflected downward, passing beneath the spleen and tail of pancreas. From this point it was deflected at a nearly right angle, downward, and found in the omentum opposite the left twelfth rib.

The abdomen contained a small amount of serous fluid. There were slight adhesions of the intestinal coils to each other and to the parietal peritoneum.

DISCUSSION.

Dr. Lincoln: I desire to say that some fourteen years ago in Nebraska I saw a boy who received an injury of the rectum in a similar manner to that mentioned by Doctor Gardner, by sliding from a load of hay and the handle of the fork entering the rectum. There was blood on the handle of the fork for some eight inches. I could not, from an examination, make out any perforation of the rectum. As I remember the case, the bowels were locked up with opium and at the end of some ten days or more he recovered. This is the only case I have seen.

Dr. Binnie: I wish to mention a case, although I did not see it. The case occurred in the practice of another Wisconsin physician. A man, in sliding off a load of hay, was injured in exactly the same manner as described by the essayist. The case went along for two or three months, and he finally died. Dr. Meacher of Portage saw the case in consultation.

Dr. S. Vivian: I know of another case precisely similar to those mentioned which occurred last August about eight miles from Mineral Point. This man was about thirty-eight years of age. He slid off a haystack and the fork handle penetrated the rectum some seven or eight inches. The attending surgeon concluded that it was necessary to establish an artificial anus. Accordingly, a colotomy was performed, and in about twenty-four hours the patient expired.

Dr. W. S. Caldwell: About ten years ago, as near as I can remember, I was called in consultation to see a man who had slid off a haystack onto a pitchforth in about the same way as mentioned. In that case the pitchfork penetrated so high as to enter the middle of the right lung, and with simple expectant course of treatment the man made a good recovery.

Dr. A. L. Clark: Some three years ago I was awakened in the night by a fellow practitioner who wanted my assistance at the hospital. The case was that of a young woman who had been shot accidentally by a .32 caliber bullet, the bullet having passed in three inches to the left of the umbilicus and half an inch below it. Immediately after the receipt of the injury she vomited blood, although her condition was not one of extreme prostration. We decided to do an operation at once. Upon opening the abdomen it was found, notwithstanding the position in which the bullet had entered, the stomach was perforated. Besides, there were five perforations of the intestine, which we closed. The bullet took a downward direction from where it entered, passing very close to the common iliac artery, so much so that the artery could be felt pulsating. We closed the wounds as best we could, but at the end of twenty-four hours she died, after having reacted apparently well from the operation and had given us hope for recovery. Her death was due, as we found afterward, to the fact that some branch of the iliac artery had been cut off, and consequently hæmorrhage set in. The bullet was extracted close to the crest of the ilium posteriorly. We enlarged the wound so as to afford free drainage and easily extracted the bullet. Had there not been a severing of this arterial branch the patient undoubtedly would have recovered. At the post-mortem we found that where the wounds in the stomach and intestines had been closed an adhesive inflammation of the peritoneal coats had taken place, and it seemed evident that she might have recovered had it not been for this unfortunate hæmorrhage.

Dr. F. A. Dodson: It is a matter of great astonishment to me that, considering the number of cases that have been reported here to-day, and others that could be reported, the literature is so limited on this subject. In reference to injuries of the bowels, some years ago I saw a man who, in sliding down a haystack, sustained an injury to the intestines, as was proved at the post-mortem. He vomited and passed more or less blood from the bowels for a long time, but still there did not seem to be any great distress apparently. This condition continued for three or four days in spite of all the efforts we made to subdue the pain from which the man was suffering. At

the end of this time he died, and a post-mortem was asked for and consented to, and we found three rents in the intestines. The question arose afterward whether, if some of you gentlemen had had that case, you would not be warranted in opening the abdomen and searching for the cause of the man's distress. There is much to be said with reference to the treatment of abdominal injuries, and there is much that perplexes us in our work.

Dr. D. S. Fairchild: I believe that one of the points the essayist desires to have brought up is the reference to the advisability of making abdominal section in cases of penetrating wounds of this kind, and perhaps it would be well for some of the gentlemen to discuss that feature.

Dr. A. I. Bouffleur: I desire to explain one point in connection with this paper. Dr. Gardner has reported the first part of this paper before, but at my earnest solicitation he consented to reread that part because of the uniqueness of the case. A gentleman in this city had occasion to look up the literature on this subject some years ago and he was only able to find something like twelve cases. Very, very few of the fatal cases are placed on record. It seems to me, it goes to show that we are not near so anxious to report our unsuccessful as we are our successful cases, because the class of cases under discussion are so uniformly fatal. Occasionally, as Dr. Caldwell reported, they get well.

The features of Dr. Gardner's case were interesting, especially the first one, as the patient seemed to have passed the period when we would expect an infective peritonitis to prove fatal; evidently there was leakage of some sort that caused the peritonitis. These injuries are so uniformly the same that it is really remarkable that there has not been some systematic work done in looking the subject up. You will notice that we have had three additional cases reported here. At the Iowa State Railway Surgical Association some six or seven cases were reported of the same character in which the injuries were inflicted in precisely the same way.

As to the advisability of operating on these cases, so far there is very little to support us except on a general basis. However, our present knowledge of penetrating wounds of the abdomen and in other localities would indicate very strongly the propriety of opening the abdomen in these cases, especially so as we have the fork passing through an infected canal like the rectum. If we consider it proper to operate on a case of penetrating wound of the abdomen, it seems to me there would be indications for operation in a case where a fork handle entered the rectum and had perforated the rectal wall. I believe the results would be different if more were operated on. However, we have not operated on a sufficient number of cases to furnish us any criterion. I know of only two cases that have been operated on, and both patients died, but that is no argument against proper treatment. On general principles, there is no question but that when the abdominal or peritoneal cavity has been entered it is proper to operate, to make sure that no viscera have been perforated, excepting the rectum, and to close up the wound in the rectum. Gunshot wounds are interesting, and it is surprising how these cases will run. Within the past week I have seen three patients with gunshot wounds in which some of the points brought out by Dr. Gardner were plainly shown. One of them was a rather fleshy lady, who was shot in such a way that the bullet passed clear through one breast into the base of the other breast, inflicting a large wound in the second breast. In this case there were no pulmonary symptoms, although one could see the opening between the ribs and I could put my finger between the ribs. As there were no evidences of blood in the pleural cavity, and it was not deemed necessary to probe the wound, nor to open the chest wall, and the patient promptly recovered without any untoward symptoms. This is a case in which the bullet entered the thorax but did not pass into the pleural cavity, or if it did do so, it was obliquely, so as to form a valve-like opening; the bullet may have dropped down into the pleural asc.

On Tuesday of this week I had a case in which a man was shot three times, one bullet passing through the arm, one in the side of the hip, and the other crossing the costal arch. There was no penetrating wound at this point (illustrating) and the wound in the arm was in close proximity to the vessels, yet a very diligent search for the missile failed to find it. One of the other bullets was removed. An attempt was made to remove the bullet in the

arm on account of the fact that he had a localized erythema immediately beneath the biceps tendon, but in searching that locality no bullet could be found.

Another case occurred this morning. A man was shot three times, one bullet entering at the side of the umbilicus and coming out on the other side, having traversed the abdominal wall three or four inches. Another bullet had entered the arm. The question came up as to whether one of the bullets had entered the peritoneal cavity or not. There were certainly no symptoms of it. In those cases where a bullet does not traverse the abdominal wall for a great distance, I do not think the indication for operation is as positive as some surgeons would have us think. On the other hand, it is a common occurrence to find in wounds of the chest that a small portion of the abdominal wall has been traversed, and that a piece or pieces of clothing may be carried in with the bullet, resulting possibly in the formation of abscess. Therefore, some operators insist on opening up every one of these tracts for two purposes: First, to determine definitely whether the peritoneal cavity has been entered, and, secondly, to ascertain whether or not any foreign bodies are left in the canal. We know that sometimes a bullet enters near the umbilicus, comes out at the back and does not enter the abdominal cavity at all. Much depends upon the tenseness of the muscles of the abdominal wall. I am sure, if you had such a wound you would want to be sure of the fact that it has traversed no great distance of the abdominal wall, and you would further want to be sure that the bullet has not entered the abdominal cavity.

Dr. Bell: I have had two cases come under my observation similar to those that have been reported. A man in sliding down a haystack was caught upon the handle of the fork, the instrument penetrating the rectum about eight inches. Fortunately, he had taken a large dose of salts that morning and had a copious evacuation of the bowels an hour previous to the accident. The opium I gave him after the accident for the purpose of relieving pain locked his bowels, and he did not have a bowel movement until I washed the bowels out. I simply washed the rectum with sterilized water twice a day, and this was the extent of my treatment for the first week. After this I found it necessary to introduce rectal bougies, and unfortunately I did not pass them high enough, and so I had a stricture to break up afterward. This man is now living and is perfectly well.

Another man, in running a thrashing machine, lost his balance and caught upon the end of a crowbar, deeply set in the ground, and there he hung until a comrade came to his rescue and got him off. The hæmorrhage was so profuse in this case that the man died at the end of four days.

Dr. E. O. Plumbe: I wish to cite a case of injury to the rectum. I was called in consultation about four years ago by another physician to see a man who had sustained an injury by a fork handle penetrating the rectum about eight and a half inches. I saw the patient two days after the receipt of the injury; there was no elevation of temperature, and, as far as we could judge, no serious injury to any of the abdominal viscera. The sphincter was lacerated. The attending physician was using a solution of boric acid, and giving the man calomel and soda, as well as morphine. I made no change in the treatment. He informed me about ten days later that the man had died.

I recall another case that came under my observation about twenty-five years ago of the same nature, but in that case the handle of the fork penetrated two inches and a half and injured the peritoneum. At that time it was considered certain death to open the abdominal cavity, and we thought it was just as well to let the patient die from the injuries as from the operation. This man died forty-eight hours after the injury.

Dr. R. J. Coyne: It seems to be the consensus of opinion that in cases of penetrating wounds of the abdomen it is proper to open up and explore the cavity. I think that is the plan recommended; while a question arises in a case of penetration of the rectum when would you operate? Would you operate immediately after the receipt of the injury, or would you wait for symptoms? I can hardly conceive of the handle of a pitchfork entering the rectum eight inches, passing the promontory of the sacrum and entering the sigmoid flexure with all its variation and course. It is simply the entering of a straight stick up a man's crooked bowel. It must impinge, as

the canal is crooked. It must impinge upon the peritoneum below the sigmoid flexure or the descending colon, and in passing that point, on account of the violence, it must inflict injury upon the peritoneum, and when a patient dies of peritonitis in such a case it is either the result of penetration by the instrument or severe contusion of the parts. Peritonitis sets in and suppuration will take place in the peritoneal cavity. I wish to cite a fatal case:

I was called in consultation with a physician, who is now dead, to see a man who was hauling grain. He was wearing a truss. In climbing to his box his feet slipped, he fell upon his truss, receiving a slight bruise. The hernia did not protrude, but the weight of the fall against the truss contused some of the abdominal viscera, probably a fold of omenum. The man suffered great pain from the receipt of the injury. There was nothing that had been penetrated, but it was simply the pressure of the fall against the truss. There was quite a little shock, but there was no elevation of temperature nor acceleration of pulse. In fact, the pulse was slower than natural. We concluded that an operation might be necessary, but we did not like to open the abdomen until symptoms of acute inflammation had taken place. Pain continued and for its relief he was given hypodermic injections of morphia, and when evidences of peritoneal inflammation set in, instead of sending for me, they sent for another physician, and he agreed with the physician in charge that an operation was not necessary. The man died within forty-eight hours. The understanding was that when I left the case as soon as certain symptoms arose he should let me know and we would immediately operate. Post-mortem examination revealed general peritonitis with the abdominal cavity nearly filled with pus.

Here was an injury received by the man simply falling upon his truss. If that could injure the peritoneal cavity or its contents sufficient to set up an inflammation to destroy a man's life in forty-eight hours from the time I saw him, would not the introduction of a straight, large-sized shaft of a pitchfork entering the rectum injure the peritoneum without entering it sufficiently to cause such an inflammation? If that were true, an operation would be necessary at once, if it was nothing more than to evacuate the serum that would be discharged and to wash out the abdominal cavity, and thus in all probability check the progress of the peritoneal inflammation. Of course, if the shaft of the fork entered the peritoneal cavity, there is nothing under heaven that could save the patient except an operation, and that might also fail. But it is safe, where we have a severe injury and considerable collapsing of the abdominal cavity in case of gunshot wound, to operate, except the bullet is exceedingly small.

The conduct of the bowel is remarkable in penetrating wounds from a small-pointed instrument. The ball may cut two or three loops of the bowel and at the same time the person may not die of peritonitis from extravasation of fæces. The conduct of the bowel shows the remarkable provision of nature; the mucous membrane rolls out, becomes thickened and absolutely plugs a small penetrating wound from the inside. Of course, a bullet in traversing may carry some septic material in with it, and the case may go on and die, but a great many cases have gotten well when the bowel was absolutely penetrated by a small bullet by the conduct of the small bullet itself. In the case of a pitchfork entering the abdominal cavity, there is only one alternative, and that is to operate early before general peritonitis sets in. After general peritonitis, by thorough sterilization with sterilized water, you might possibly save a patient.

Dr. W. S. Caldwell: While it is the consensus of opinion that in penetrating wounds of the abdomen we should perform laparotomy, it is not a universal practice by any manner of means among some of our best men. Richelot, for instance, who has possibly had more experience in this kind of wounds than any man living, has come to this conclusion, that if there are no urgent symptoms, let the patient alone. He says that many patients recover after the bullet has passed through several coils of the intestine, and if there are no urgent symptoms he would let the patient alone.

Dr. Bouffleur: Is that your practice, Dr. Caldwell?

Dr. Caldwell: It is.

Dr. Coyne: The let-alone policy will do if the ball is small. I am in favor of waiting in cases of wounds made with small pistol bul-

lets until there are symptoms requiring surgical interference. But if the ball is a large minie ball or musket ball, it will tear such a hole in the intestine that nature cannot plug it up and the contents of the bowel will surely extravasate into the cavity.

Dr. E. O. Plumbe: During our Civil War I was in the service as medical officer for four years and during that time we had a large number of cases of gunshot wounds, particularly abdominal wounds from minie balls, and 90 per cent of the cases proved fatal. In fact, I recall but one case that recovered.

Dr. F. N. Bowdick: I was called in the fall of 1886 to see a case of gunshot injury to the right side and arrived four hours after the accident. I found a slim young man, 24 years old, sitting up in a rocking-chair in great pain and in a condition of serious shock, and protruding from the lower right side of the chest the larger end of an iron ramrod of a gun. I was shown the other end of the rod, over two feet long, which had passed through the window and been picked up ten rods from the house, the accident having taken place in the house. I was told that the rod had passed through his body. I gave him half a grain of morphine and a large dose of whisky and waited twenty minutes before attempting to remove the projecting piece of iron. By careful manipulation I found that the rod was bent inside the body, and that the bent was downward, and by lowering the outer end I easily extracted it. I found that four inches was inside the body and five inches outside. It entered two and a half inches below the nipple on the right side and half an inch inside of the mammary line, and its exit was exactly opposite two inches from the center of the spinal column between the ribs.

He had been cleaning an old-fashioned single-barreled shotgun, three feet long in the barrel with its accompanying rod. He was swabbing it with butt end of the rod covered with a cloth. He was standing with butt end of the gun upon the floor, which brought the body at about right angles with the gun. Suddenly the gun was discharged and he fell to the floor. He was taken up and the only position that he could maintain was in a rocking chair slightly tilted back.

There was no indication that the pleural or abdominal cavities had been entered; but the pain was very severe about the liver. There was no bleeding from either wound. I washed the wounds with carbolic solution and hermetically sealed them with plasters. The treatment was morphine sufficient to completely relieve the pain. He sat in his chair for a week, had no untoward symptoms and was about in two weeks.

The curiosity of this case to me is how the rod was broken. It was made of very poor iron and about a third of an inch in diameter. It was broken off squarely and the broken surface looked to me like malleable iron. The bend at the broken end included about three inches of rod and the curve covered three-quarters of an inch from the line of the rod. The portion that passed through the body was straight.

Dr. Gardner (closing the discussion): I am gratified that my paper has elicited such a free discussion and that so many cases have been reported by the members. We have had about nine cases reported, five of which were fatal and four non-fatal, all of which, from the descriptions given, appear to be similar. I had no idea that the reading of my brief, unpretentious paper would result in the recital of so many cases. If this subject could be referred to our national association, and if three or four hundred physicians talked as freely as you have here to-day, I am satisfied many more similar cases would be placed on record. It is a wonder to me that some of our text-books do not have a section or chapter devoted to this subject and deal with it somewhat extensively. The gentlemen who have discussed my paper have raised the question of the advisability of abdominal section. I believe in the future that this will be done. I hope, when Dr. Bouffleur writes an article for some of our surgical text-books, that he will be assigned to that section and collate these cases.

Never make a palm or incision in abscess except in the middle of the lower third and in the axial line of the fingers or at the sides of the palm. In opening a deep abscess in the lumbar region do not forget to cut down opposite a transverse process and not between them, for fear of wounding a lumbar artery.—Fenwick.

Annual Meeting at Richmond, Va., May 31, June 1 and 2.

RELATION OF INJURY TO DEATH FROM PNEUMONIA.*

By W. T. Sarles, M. D., Sparta, Wis.
Surgeon C., M. & St. P. Ry., etc.

Injuries cannot be prognosticated with safety, especially those about the chest, until sufficient time has elapsed to preclude chances for infection by pneumococci in a possible solution of continuity of lung tissue. All injuries of the chest, of a violent character at least, should be treated with the utmost precaution relative to diagnosis owing to this possible and disastrous sequela.

Cases in my recent experience having died from pneumonia on the fifth day following receipt of injury, when up to the time of infection the symptoms were favorable for recovery, led me to believe that one could not safely rely upon manifest symptoms until the period for probable infection had elapsed. It therefore seemed apparent to me that a few remarks upon this subject, sufficient at least to bring out discussion, would be of profit at any surgical meeting.

S. S. Herrick, in "The Reference Handbook of the Medical Sciences," quotes Weichselbaum as holding that "bacteria chiefly causing pneumonia are the diplococcus of Fraenkel, but that streptococcus and staphylococcus may be the cause, either individually or collectively, in any given case." Herrick further asserts that Platini (1890) found that "inhalation of the pneumococcus failed to cause pneumonia while the mucous surface of the respiratory tract maintained its integrity. After traumatism of the thoracic walls, infection took place.

"It was found that animals after inoculation had more elevated temperature and more extensive pneumonic lesions, and succumbed more rapidly when subjected to refrigeration than other animals similarly inoculated but not exposed to cold. On the other hand, exposure to cold without the inoculations failed to induce pneumonia." He further observes, among other conclusions, that "a solution of continuity in the mucous surface of the respiratory tract is a necessary antecedent to pneumonic infection. He cites "bronchial catarrh with cough as the most common predisposing cause, and violent injury of the pulmonary structure in any manner as efficient cause also." Therefore it is apparent that the entrance and development of the microbe is effected through hematogenous infection in the same manner as the exogenous infection of objective traumatisms.

W. J. Tyson, in the Lancet (June 26, 1897) recognizes the following clinical types of pneumonia:

"Pneumonia of influenza, septic pneumonia, pneumonia of the aged, and alcoholic pneumonia." These classifications signify simply the infective agents operating upon the patient, having the necessary solution of continuity of lung tissue and conditions favoring their development. The entrance and development of the pneumococci being the same in traumatisms due to accident as that due to inhalations of ether or to surgical operations or disease; hence the difference is rather in the character of the infective agent than in the mode of infection.

Case I. J. M., 36 years of age, received an injury to apex of right chest, of a penetrating character. Lung tissue was penetrated; no serious hæmorrhage followed. Wound was dressed antiseptically and made impervious. Patient improved with evidences of speedy recovery until the fourth day, when he had a severe chill followed by double pneumonia and death on the fifth day after the injury.

Case II. H. V., about 40 years of age, in April, 1898, fell from fast mail train when running at full speed. Was brought to our city, and when I first saw him was unconscious, suffering from shock, but received no fractures. Had skin and scalp contusions and lacerations. Recovered consciousness in a few hours, coughed and spit blood, but a small amount. Sat up the following day to be shaved, felt greatly improved and insisted he could continue his journey to his home in Chicago the following day. The beginning of the fourth day he had a severe chill, followed by double pneumonia, and death on the fifth day after the accident.

Case III. C. N., 26 years of age, on Sept. 26, 1898, was kicked by a vicious horse in his left chest. Had pain and dyspnœa, with spitting of blood and evidences of cardiac dilatation and injury to lung tissue; had no deform-

*Read at the sixth annual convention C., M. & St. P. R. R. Surgeons, Chicago, November, 1898.

ity of chest walls. Continued to improve until the morning of the fourth day, when he had a severe chill, and double pneumonia followed by death on the fifth day following the accident.

These three cases, terminating in death in this manner, led me to investigate the relative frequency of this pneumonic infection following injury, but I could find none recorded. I therefore consulted the results in 50 cases of injuries in my own experience, received in railway wrecks or under conditions of much force and shock from other causes.

One was a gunshot through right lung. Ten were falls from moving trains, one of which was in the case of a lady 50 years of age, who fell from a passenger train between stations. She remained in the wet and cold in the early springtime from 9 p. m. until 6 a. m. before being discovered; had a broken arm and ribs. Made an uneventful recovery without evidences of pneumonia.

One other fell through a bridge from a moving passenger train to the water twenty feet below, where he remained in the wet and cold, with a dislocated left thigh, for more than an hour before discovered. And still another who jumped through a sleeping car window when train was running full speed on a heavy down grade. Went bareheaded and barefooted into the snow, where he remained for nearly an hour before rescued; still no pneumonia developed in either case and both made uneventful recoveries. The balance of the fifty cases were subjected to exposures or serious injury or operation, but only the three reported became subjected to pneumonic infection and death.

In conclusion, it is evident from experience and experiment that the severity of the injury and exposure to wet and cold is not so important a factor in the relation of injury to death from pneumonia, as that there shall have been some solution of continuity of lung tissue; wherein the ever present staphylococcus or streptococcus of Frænkel, individually or collectively, may produce a pneumonic infection.

DISCUSSION.

Dr. F. R. Garlock: This is an interesting paper and it deals with a very important subject, as the development of pneumonia following injuries comes under our care quite often. I have a case to report which I think ought to have had pneumonia, and I will relate it: A man left Chicago on the 6:30 train and near Racine he passed from one car to another and accidentally fell off the platform onto the ground, receiving bruises and wounds. He laid there from about 8:15 in the evening until he was found the next morning, perfectly stunned and shocked. It was cold; ice was on the ground at the time. He did not develop pneumonia, although there was a fracture of the rib and severe cuts about the head. There is something peculiar about the development of pneumonia; it will not develop in a person unless there is some exciting cause; the right germs must be present before a man will have the disease. This man was taken to the Racine Hospital, kept there for four weeks, at the end of which time he had recovered sufficiently to return to his home. Now, it seems to me this man ought to have had pneumonia if exposure of the lungs alone would cause it.

Dr. S. A. Spillman: This is certainly an important and interesting subject to the railway surgeon. Personally, I have never seen a case of traumatic pneumonia, but some years ago a man was brought to our town injured, in which it was claimed that the traumatic pneumonia was followed by consumption and death, death occurring within a year after the receipt of the injury. The case came to trial and a verdict was rendered in favor of the plaintiff for $2,400. As a result of this the case was appealed, a new trial was granted, and I believe the railroad company escaped paying this amount for some reason or other. I do not remember the particulars of the case further than the first trial; at any rate, the company was finally not held liable. There was a great deal of discussion with reference to traumatic pneumonia then, and at the time I had occasion to search the literature considerably on that subject. Evidence was given to show that this man had had hæmorrhage of the lungs before he received the alleged injury, and it was considered doubtful whether the injury itself had any particular bearing on his case. But the case made a deep impression upon me at the time.

Dr. D. S. Fairchild: In the case Dr. Spill-

man refers to symptoms of lung trouble did not develop until two months after the alleged injury occurred.

Dr. E. O. Plumbe: I had a case of traumatic pneumonia two years ago last summer, the man having sustained a crushing injury to the chest by being caught between two engines and three days after the injury pneumonia developed. He died. So far as could be ascertained there was no fracture of the ribs. Hæmorrhage of the lungs occurred on the first day after the receipt of the injury, shortly after which it ceased, and the man was apparently doing well until pneumonia developed.

Dr. Sarles (closing the discussion): I have very little to say in closing the discussion, except to remark that I believe we have more cases of death from pneumonic infection on account of injuries to the pleura and injuries to lung tissue than most of us have any idea of, if we only sift them closely. I believe, too, that in every injury where a man spits blood, or in every injury where we have reason to believe lung tissue has been injured, if we do not give a prognosis until the fifth day, we will be safer.

Lightning Stroke Causing Eye Diseases.

By G. Sterling Ryerson, M. D.

I wish briefly to report two cases of lightning stroke affecting the eye, which may prove of interest to the association. These cases are quite rare. Seven or eight years ago a farmer, with his wife and child, was asleep in bed in an isolated farmhouse near Lindsay, Ontario. A thunderstorm came up during the night; lightning struck the house, passing through the bed, which knocked it to pieces, in which these people were sleeping. It killed the child instantly, paralyzed the man so that he died shortly afterward, and blinded the woman. The loss of sight was not instantaneous. Next day she noticed that objects were indistinct; this haziness gradually increased until she was unable to distinguish objects. It was at this time that she was brought to me. Examination showed an imperfectly developed soft cataract in each eye. As she was only twenty-five years of age I needled the lens and removed the cataract by a linear corneal incision two days later. I removed the lens of the other eye in the same way a few weeks later. I saw this patient last August, when she told me that her sight remained excellent.

My other case I saw at the Toronto General Hospital, two or three years ago. The patient was a woman aged 50 years. She was standing at her door, watching a thunderstorm which was in progress, when a flash of lightning struck quite close to her. She was not burned or injured, but was instantly blinded. When brought to the hospital a few hours later, I found wide dilation of both pupils, intense congestion of the conjunctiva, sclera, and eyelids. There was no burning or excoriation of the parts. There was no perception of light nor pupillary reaction, nor was there any considerable pain. With the ophthalmoscope the media were seen to be clear, but the optic nerve entrance and region of the yellow spot were hazy. There were marked engorgement and turgidity of the retinal veins. In three days the patient began to perceive light and the pupil to contract. In eight weeks she was discharged cured, but with a sensitiveness to light and difficulty in near vision. I did not see her afterward.

I have already mentioned the rarity of these cases of lightning stroke affecting the eye. An examination of the text-books of Noyes, Soelberg, Wells, Fuchs, Berry, and others, failed to add any information on the subject. In Norris and Oliver's work I find, on page 287, a brief account. From it I learn that Leber has collected eighteen such cases. As in the cases I now report, the injuries were various. In nine there were contracts; in others ptosis, corneal haze, hæmorrhages of the retina, and a rupture of the choroid. Silex relates the case of a child who was rendered senseless for five hours, and who recovered with a cloudiness of the cornea and lens, from which he made a partial recovery. It would appear, therefore, that: (1) Lightning, when it strikes sufficiently close, may cause eye troubles without affecting the general health to any extent; (2) that these injuries are of a greatly varied character; (3) that the lens suffers more frequently than do other structures; (4) that the prognosis is not unfavorable; (5) and that the lens may be successfully extracted in these cases.—Med. Record.

Never forget that: 1. Abscesses near a large joint often communicate with the joint. 2. Abscesses near a large artery sometimes communicate with the artery. 3. Abdominal wall abscesses sometimes communicate with the gut.—Fenwick.

In protrusion of the viscera never neglect to pass your finger fairly through the wound to make sure that the reduction has been complete. And be careful never to push the bowel into an interstice between the muscles or into subperitoneal tissue.—Fenwick.

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NOTICE TO MEMBERS.

Dr. Brock states that the transportation over the Chesapeake & Ohio will be good on any train and he suggests that in order to avoid overcrowding of the special train leaving Cincinnati on the evening of May 20, it will be well for as many as can conveniently do so to take one of the regular trains. It cannot be announced yet what courtesies will be extended by the C. & O. after the adjournment. Due announcement will be made at the meeting. Dr. Brock assures us that the management will endeavor to give members as pleasant a time as is in their power.

He would like very much to be informed from time to time, not later than May 25, how many surgeons will be in attendance coming east from Cincinnati, so that necessary provision may be made for their comfortable transportation. As before stated, Dr. Brock's address is 206 E. Franklin street, Richmond, Va.

PENETRATING WOUNDS OF THE RECTUM.

One of the "Two Cases of Traumatic Surgery," referred to in Dr. Gardner's paper in this issue, is a penetrating wound of the rectum. This subject is thoroughly covered in a recent paper (Medicine, June, 1896) by a prominent Chicago surgeon, Prof. Weller Van Hook. Having had his attention attracted by a case occurring under his own observation, Dr. Van Hook was able to collect 11 other unpublished cases, besides 45 from the literature.

The original paper should be consulted by those wishing full details. Space will only permit the citation of some of our author's conclusions.

He concludes that the arrangement of the bony and soft parts has a tendency to direct penetrating bodies into the rectum. The plica transversalis and the oblique relation of the rectal axis to the plane of the pelvic outlet favors perforation of the anterior wall of this part of the bowel low down. The size and shape of the entering body bear a great relation to the character of the lesion, though very blunt objects produce rather clean wounds on account of the great force of the impact. After the rectum the bladder is most often involved, though various other structures (e. g., the sacral nerves) may be wounded.

Regarding prognosis our author tells us that recovery has taken place even when the pelvic and abdominal cavities have been traversed and the thorax penetrated. In 30 cases in which the peritoneum was presumably not injured the mortality was nil; when, however, this structure was penetrated 71.4 per cent died. Dr. Van Hook states that suitable operative measures should be undertaken as promptly after these accidents as in cases of gunshot injuries of the abdomen.

The number of cases mentioned during the discussion of Dr. Gardner's paper coroborate Dr. Van Hook's opinion that: "While rupture of the rectum by penetrating bodies has been recorded in medical literature only about 47 times, its frequency is doubtless much greater.

THE USE OF STREPTOCOCCUS SERUM.

In 1895 Marmorek of the Pasteur Institute of Paris announced that he had produced an efficient anti-streptococcic serum. On account of the grave nature of the streptococcus infections this announcement caused great interest and clinicians began to try the new serum. From that time to the present many

reports have been made by different observers and considerable clinical material has been accumulated, so it is time that an effort be made to strike a trial balance as regards its value. This Cotton of Boston does in a recent number of the Boston Medical and Surgical Journal.

In ordinary media the streptococci rapidly lose their virulence, and Marmorek succeeded in avoiding this by using for culture media serum from the horse and ass. By raising a culture to a high degree of virulence he was able to keep it practically constant. The animals were then immunized by a series of injections of living cultures increasing both in dose and virulence. These animals were allowed to rest for a month in order to avoid any toxic effects from the serum itself, and the serum extracted at the end of this time was powerful enough to protect rabbits against streptococcus germs. This observer found that 0.2 c.c. of serum would protect a rabbit against ten times the fatal dose of streptococcus cultures if injected eighteen hours before.

The clinical observations relate to many diseases, among the principal ones being puerperal septicæmia and erysipelas. Cotton is able to collect 107 cases of the former treated with the serum with a mortality of 31.7 per cent (34 deaths). The high mortality is to be attributed to the severity of the infection and to the fact that treatment was commenced late. On the other hand Wignhoff reports a case of osteomyelitis with streptococci in the blood where dozens of injections had no effect apparently, and though the patient recovered it was only after a period of high temperature lasting for twelve weeks. In erysipelas the serum has been frequently used. Marmorek himself has used it in 413 cases with a mortality of 3.87 per cent. In a previous lot of cases in the same service the mortality was 5.12 per cent. According to this author doses of 5 to 20 c.c. cause decided improvement in from five to twelve hours, with rapid decline in the fever and pulse rate and equal improvement in the local lesions. The total quantity administered was from 10 to 120 c. c.

Park, in a paper read before the New York Academy of Medicine.* states that after streptococci appear in the blood it is useless to expect to confer immunity by injecting the serum. He believes the serum should be used in suitable cases, though no remakable results need be expected. Prof. Cheyne states that in cases where he suspects wound infection he commences the use of the serum at once, before the infection manifests itself, and he thinks his results justify the practice.

In his summing up Cotton believes that the serum should still be used in cases of true streptococcus infection, a good quality should be used, and in large doses, probably about 10 ctm. in man. Lastly, until more decisive evidence is at hand regarding its powers, that it should not supplant other treatment, but be used as an adjunct only.

*Med. Record.

Medico-Legal Notes.

Master and Servant—Railroad Relief Department—Release—Contracts Avoiding Liability for Negligence—Constitutional Law—Law of the Case.

(Supreme Court of South Carolina. January 16, 1899.)

1. Where the trial court decides that a contract set up as a defense is void, but gives judgment for defendant because plaintiff has accepted benefits under the contract, the decision as to the validity of the contract is not the law of the case, and on appeal by plaintiff the Supreme Court may pass on the question. By a divided court.

2. Const. 1895, Art. 9. Sec. 15, provides that railroad employes shall have the same rights and remedies for injuries suffered from the acts or omissions of the corporation or certain employes as are allowed by law to persons not employes, and that their representative shall have the same right of action for their death; that knowledge of any employe of the defective or unsafe condition of ways, etc., shall be no defense to an action for injury caused thereby, except as to conductors and engineers voluntarily operating unsafe cars or engines; and that any contract, express or implied, made by any employe to waive the benefit of the section shall be void. Held, that the section has no application to a contract between an employe and the company exempting the latter from liability for its negligence. By a divided court.

3. When a railroad employe, by becoming a member of the relief department of an organization composed of several railroad companies and their employes, established to raise a fund for the payment of specific amounts

to contributing employes when disabled by sickness or accident, the companies guaranteeing payment of benefits, agrees that the acceptance of benefits after he shall have received injury shall release the companies from all claims for damages therefor, it is not void as a contract exempting the company employing him from liability for negligence of itself or employes, though the employe is required by the company to become a member of the department. By a divided court.

4. Conceding that such agreement be void as exempting the company for liabilty for negligence of itself and employes, yet if the employe, after sustaining an injury, accept the benefits, and in consideration thereof release the company from liability for the injury, the release is valid. By a divided court.

Action by Willis Johnson against the Charleston & Savannah Railway Company. From a judgment for defendant plaintiff appeals. Affirmed by a divided court.

An experienced traveler who steps out of a sleeping car and falls upon the track when he supposed he is entering the car closet, while the train is passing through a tunnel and the car is dark, at about 6 o'clock in the morning, is held, in Piper v. New York Central & H. R. R. Co. (N. Y.) 41 L. R. A. 724, to be guilty of such negligence as will preclude his recovery even if the carrier is negligent.—Chicago Law J.

The Texas Supreme Court has reversed the decision of the lower court in giving Rosa Langston judgment for $25,000 in a suit against the Chicago, Rock Island & Texas. The plaintiff was injured while trying to get on a train and both feet were crushed. The verdict obtained in the Montague County District Court was affirmed by the Fort Worth Civil Court of Appeals and the defendant took an appeal to the Supreme Court. The ground of the reversal was the intemperate language of the plaintiff's attorney, who alleged in his argument that the accident was due to the drunken condition of the entire train crew, an allegation entirely unsupported by any testimony. There were other errors assigned but they were not passed upon.

We have examples once in a while in this country of the aptitude of the average individual for exaggerating a claim against a railway company. When an engine kills a cow, it is too often found to have selected for massacre the best-blooded beast in the county; and apparently trivial injuries to a human being, so far as surface indications go, are usually accompanied (until the verdict is rendered) with internal complications of a most serious and crippling character. The best efforts of American imagination, however, appear weak and contemptible beside the superb ingenuity of the Oriental mind when it sets itself seriously to work on a similar subject, as is shown by the following claim presented against the American-Oriental Construction Company, which is building the line from Chemulpo to Seoul in Korea.

It appears that a Japanese coolie was struck by a heavy clod of earth. No bones were broken; there was no internal injuries. He was somewhat sore and bruised, so that he stayed away from work for fifteen days, for all of which fifty dollars would have been liberal compensation. But here is the claim that the coolie put in:

COPY OF CLAIM MADE BY M. KONDO FOR DAMAGES SUSTAINED ON NOVEMBER 15, THROUGH BEING INJURED BY BLASTING WORK BY RAILWAY COMPANY.

Chemulpo, Korea, Nov. 30, 1898.

	Yen.
Nurse for 60 days, of which three for 10 days, two for 20 days, one for 20 days	165.00
Traveling expenses for family to and from Japan	100.00
Sojourning expenses for family for 30 days	90.00
Sojourning, go and back 60 days	120.00
Disease quit from work 60 days	100.00
Nourishing father and mother for 20 years	7,200.00
Claim for personal damages for 40 years	9,600.00
	17,375.00

Justice Irving, at Vancouver, B. C., has set aside a verdict for $6,000 secured by a conductor in a suit against the Canadian Pacific for the loss of a foot, holding that a railway company could not be held liable when it was ignorant of any danger in its roadway.

Miscellany.

Transportation to Richmond.

The following additional replies have been received:

ALLEGHENY VALLEY RAILWAY.

This company will take pleasure in honoring requests from proper officers of other companies for transportation of their surgeons over our lines and will make requests for our company surgeons.—Chas. B. Price, acting general superintendent.

ATLANTIC COAST LINE.

We shall be pleased to honor requests from the proper officers for transportation of surgeons over our line, and will also be pleased to request passes for our surgeons.—J. R. Kenly, general manager.

ATLANTA & WEST POINT.

I shall be pleased to honor requests from the proper officers of other companies for transportation for surgeons in the employ of these companies and shall make requests on managers of other lines.—Geo. C. Smith, president and general manager.

BALTIMORE & OHIO.

We will issue and procure transportation for such of our surgeons as we think it feasible to attend the convention and also honor requests made on us by the proper officers of other companies.—F. D. Underwood, general manager.

BOSTON & MAINE.

We will honor requests from proper officers for transportation for surgeons over our line and we will also make application for any of our surgeons who may desire to attend.—T. W. McKinnon, first vice-president.

CHICAGO, MILWAUKEE & ST. PAUL.

This company will issue free transportation over its lines to members of the above association attending the annual meeting upon request of the proper officer.—W. G. Collins, general manager.

CHICAGO & WEST MICHIGAN—DETROIT, GRAND RAPIDS & WESTERN.

I shall be pleased to honor requests from the proper officers of other companies for transportation of surgeons in their employ and will also make requests for transportation of surgeons in our employ.—Chas. M. Heald, president.

DELAWARE, LACKAWANNA & WESTERN.

This company will be very glad to honor requests from the proper officials for transportation of surgeons en route to or from the coming convention. I will also make the necessary requests for any of our surgeons.—W. H. Truesdale, president.

DENVER & RIO GRANDE.

We will furnish free transportation as far east as Chicago or St. Louis to such of our employes of the medical department as may be given leave of absence to attend the convention. We will honor requests of managing officers for passes for their surgeons.—E. T. Jeffery, president and general manager.

FLORIDA CENTRAL & PENINSULAR.

This company will accord free transportation to the delegates attending such convention providing request is made by managing officer of their company. It will also be agreeable to request transportation for our surgeons.—D. E. Maxwell, second vice-president and general manager.

GRAND TRUNK.

This company will honor requests from proper officers for transportation for surgeons only. We will also make the necessary requests for surgeons only on the staff of this company upon the request being made through and receiving the approval of our chief medical officers.—Chas. M. Hays, general manager.

GULF, COLORADO & SANTA FÉ.

We will take pleasure in issuing transportation on proper requests for surgeons who are directly in the service of their companies. I do not think we should be requested to give passes for those who are in general practice and have only an indirect connection as local surgeons. On the other hand we will ask for no passes from other roads excepting for our chief surgeons or surgeons who are giving their whole time to our railroad affairs.—L. J. Polk, general manager.

INTERNATIONAL & GREAT NORTHERN.

This company will honor request for transportation from proper officers and make requests on managers for our own surgeons.—L. Trice, general superintendent.

LAKE ERIE & WESTERN.

We will be glad to furnish transportation when requested by proper officers of the companies employing the surgeons.—D. S. Hill, general superintendent.

MINNEAPOLIS, ST. PAUL & S. S. MARIE.

We will pass delegates going to your convention on presentation of proper credentials.—E. Pennington, general manager.

OREGON SHORT LINE.

We shall be pleased to honor requests from the proper officers of other companies for transportation of surgeons in the employ of these companies.—W. H. Bancroft, general manager.

PHILADELPHIA & READING.

We will be glad to issue transportation of the I. A. R. S. upon application from the proper officer.—Theo. Voorhees, first vice-president.

PLANT SYSTEM.

I will be pleased to honor requests from the proper officers of the transportation companies for passes for such surgeons as they may desire to attend and make the necessary requests for our surgeons.—B. Dunham, general superintendent.

SAN ANTONIO & ARANSAS PASS.

I shall honor the request from proper officials for transportation of surgeons over our line to points of connection and will make necessary requests on other managers for our own surgeons.—M. D. Monserrate, vice-president and general manager.

SEABOARD AIR LINE.

It will afford us pleasure to honor the requests of general superintendents, general managers or vice-presidents for the free transportation of surgeons and their wives.—E. St. John, vice-president and general manager.

SOUTHERN RAILWAY CO.

Dr. Geo. Ross, president of the Association of Southern Railway Surgeons, transmits the following:

It will be our pleasure to extend the cour-

tesies of our line to the members of the International Association and will furnish our own surgeons with such transportation.—Frank S. Gannon, third vice-president and general manager.

Dr. Ross adds that it is absolutely necessary to have applications over this line to any point made by managing official of the road on which the applicant is and made to Captain W. W. Green, assistant general manager, Washington, D. C.

TEXAS & PACIFIC.

We will take pleasure in furnishing transportation and will also ask connecting lines for transportation for our surgeons and will also honor requests of other lines for transportation over this road for their surgeons.—J. W. Evermann, assistant general manager.

WESTERN N. Y. & PENNA.

This road will honor requests from proper officers for transportation for surgeons in their employ and will also make requests on other managers for our surgeons.—R. Bell, general superintendent.

ZANESVILLE & OHIO.

We will honor requests of the officers of other companies for transportation of their surgeons and will make similar requests for our own surgeons.—J. H. Sutor, receiver.

Extracts and Abstracts.

Traumatic Ventral Hernia.

By J. B. Blake, M. D.

[*Continued from page 586.*]

The second case reported at the beginning of this paper was supposed to represent a variety of injury which seems to be very rare. Rupture of the abdominal wall without external wound is found usually as a result of severe violence inflicted by a blunt object, such as a wagon shaft. The writer has been able to find only a very few cases which seemed to be authentic; of these, three were due to the impact of a wagon shaft and one to a fall upon the handle of a hammer. Dr. Monks has kindly given me notes of one of these cases. A man, standing on the running board of an open car, was struck in the abdomen by the tip of the shaft of a passing team. A tumor, the size of a fist, appeared under the skin, and surrounded with much ecchymosis and swelling. The tumor increased on coughing or muscular action. The skin was not broken.

Dr. Monks saw the case twice, two weeks and eight weeks after the accident, the hernia remaining unchanged, though all the ecchymosis had disappeared at one and a half years later; the man died of aneurism of the aorta. At the autopsy Dr. Whitney found a rent in the muscular bellies of the abdominal wall, through which the intestines protruded.

Another interesting case is reported by Lotheisen. A bicycle rider ran into a wagon shaft, which struck him on the right just above the umbilicus. He had some pain and went to bed. In a day or two he got up, but at the end of a week began vomiting, and was seen by Von Hacker, who found a tumor size of apple at point of contact. The man's general condition became rapidly worse. A diagnosis of tear of rectus with protrusion and incarceration of gut was made. Patient died during the operation and the autopsy showed a bit of transverse colon protruding and attached all around the edges of the tear. The man could have been saved by earlier operation.

The other two cases, one from the City Hospital reports, and reported by Platt, were smaller in extent and existed for years. Hutchinson, in a paper on "Lumbar Hernia," says that five of twenty-nine cases which he reported were following trauma more or less closely, and were apparently through the abdominal wall rather than the triangle of Petit. If this is so, they must be considered true ventral herniæ.

Why the abdominal wall is ruptured in some cases and not in others is to be explained partly by the size and shape of the impacting body, and partly by the rigidity or flaccidity of the muscles at the time. If the impacting substance be sharp or small, the wall is likely to be perforated. If larger and blunt, the chance of injury to internal organs without laceration of muscles is increased. If the wall is tense and contracted at the time of impact, the chances of laceration are increased. If relaxed, it is carried before the impacting object.

The treatment of these cases is non-operative, except in cases of incarceration or strangulation. A well-fitting swathe appropriately padded will usually allow the patient to carry on any but very laborious work. The prognosis for life is good; for the hernia, bad. Operation, if resorted to, should be done when other methods of treatment are to be found insufficient to retain the hernia and permit the man to work. In any long standing case the gut will probably be found closely adherent to the edges of the ring. After breaking up the adhesions the opening should be closed as in any ventral or umbilical hernia.

The case reported at the beginning of the paper was probably a contusion and hæmorrhage into the muscle, with an injury to the lower intercostal nerves at point of contact. The only symptom of hernia which it did not

possess was the bulging of the wall when patient was breathing naturally and not coughing. So far as the writer can discover, this case is unique.

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A Point About Incisions and Scars in the Hairy Scalp.

By George H. Monks, M. D., Boston.

I have frequently noticed that scars in the scalp often seem to be unduly broad, much more so, in fact, than the nature of the injury and the prompt healing of the wound would lead one to expect, and for a long time I was at a loss to know the reason of this.

Some years ago a boy was sent to me in whom there was a long transverse scar directly across the back of the head. This scar had resulted from an incised wound, but after healing it appeared to be so broad that the parents of the boy desired that some operation be done with a view to making it smaller and less noticeable. It was while this case was under my care that I think I discovered one of the causes, if not the principal one, of the breadth of certain scars in the scalp. The scar in the boy's head was carefully dissected out for its entire length and fine stitches were introduced which brought the lips of the wound into perfect apposition, after which the wound was sealed up with cotton and collodion. The dressing and the stitches were removed after the usual period. The first result was most satisfactory. The freshly healed wound appeared as a fine line which could hardly be seen, except when the hair was held away from it on all sides. Everyone was pleased.

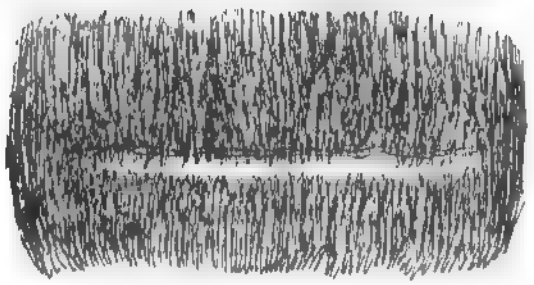
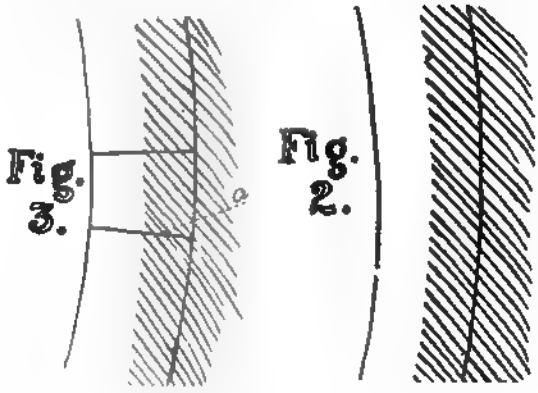


Fig. 1.

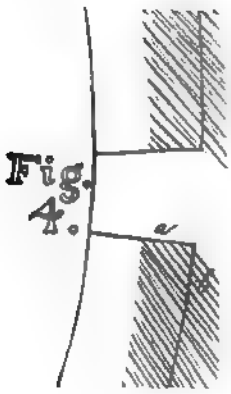
Later, however, to our chagrin, when the young man began to brush his hair the scar reappeared, and the condition seemed to be about as bad as it was before the operation, the scar showing up with unpleasant distinctness. At first I was entirely at a loss to account for all this, and was afraid the freshly formed scar tissues had already stretched; but on examining the parts carefully with a magnifying glass I found that the whitish area

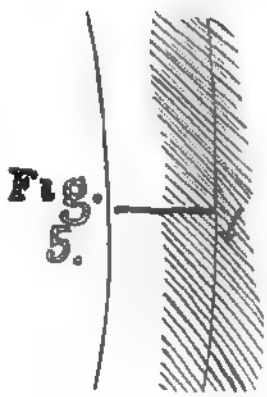


which I had considered to be made up entirely of scar tissue was by no means cicatricial in all its parts, for while the upper part was a linear cicatrix, the lower part was simply normal scalp without hair! In other words, the uper part of the whitish area was cicatricial and the lower part bald. The scar, therefore, had not stretched at all! (See Fig 1.)

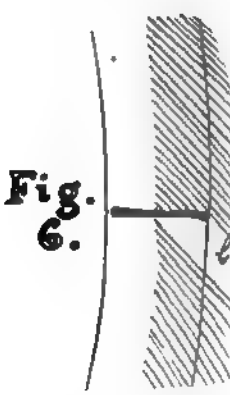
But how to account for the baldness? The hairs which originally occupied the bald area must have fallen out some time after the wound had united, for I was confident that,

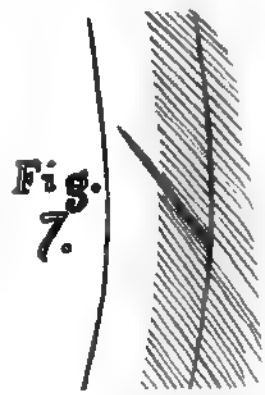
after I had removed all the dressings and stitches, there was no indication whatever of baldness anywhere near the wound. Finally the real explanation came to me: The truth is that when I was doing the little operation I had paid no attention to the fact that the hairs on the back of the head, being obliquely attached from above downward, have roots which are likewise oblique (see Fig. 2). I





had made my incisions in the usual manner of incisions, that is, at right angles to the surface of the skin, and in that way had succeeded in cutting off the roots of many of the hairs, which hairs came to the surface of the skin below the edge of the incision. (A glance at Figs. 3 and 4 will explain this more clearly.) After the healing of the wound, all the hairs whose roots had been thus cut off





subcutaneously naturally stayed in place so long as no traction was applied to them (see Fig. 5); but as soon as they were pulled upon —as in brushing the hair, for instance—they came out at once, leaving a broad strip of baldness, as it were, all along the lower border of the cicatrix. (See Figs. 1 and 6.)

From time to time, since I did this operation, I have made it a point to examine scars in the hairy scalp, and can state that in almost all the cases where I have found a scar so placed as to suggest that the original incision must have divided some of the hair roots, I have noticed a bald area on one side or the other of the real cicatrix, the whole thus giving the appearance and effect of a larger scar than actually existed. It would seem from this that most transverse scars in the back of the head must be associated with a line of baldness, while vertical ones are almost free from it; and clinical observation appears to establish this point.

From all this it would therefore seem best that whenever it is necessary for any cause to make an incision into the hairy scalp in the back of the head, and especially where it is particularly desirable to conceal the scar, the knife should be held in a position at right angles to the surface of the skin in cases where a vertical incision is to be made, but in a position oblique in reference to the skin whenever a transverse incision is contemplated; that is to say, as your knife blade goes through the scalp keep it parallel to the roots of the hairs, so as not to divide them. This point may also find its application in the treatment of scalp wounds, whenever it becomes necessary to trim the raw edges of the wound before stitching them together.

If in the case just reported I had made the incision obliquely in reference to the surface of the skin instead of at right angles to it, I should probably have had a result more like that shown in Fig. 7 than that in Fig. 6.—Boston M. and S. Jour.

The Hot Bath in Surgery.

By Thos. P. Satterwhite, M. D., Louisville, Ky.

I wish to direct attention to the hot bath in the treatment of crushed, lacerated, and contused wounds, and in severe burns and complications following such injuries.

I use hot water, after it has been sterilized by boiling, in the form of a bath, and often add antiseptics; the water is changed every three or four hours, according to the amount of suppuration or cleansing needed. This can be done without disturbing the part immersed.

When the tub is filled the limb floats in the water; at the same time it is immersed. When the water is drawn off the limb subsides until it reaches a gauze support attached to the inner side of the tub like a hammock, and then settles upon it. The spigot at the end of the tub is large, and, when the limb is well on its support, is opened to its full extent; the water is then agitated and the suction draws away all sediment. The tub is refilled by either pouring water into it or by the siphon method.

This water support to an inflamed and tender limb which needs redressing several times a day is a great boon to the poor sufferer.

The injured portion is relieved of its weight, the water supports it uniformly and softly, and allays inflammation in an exceedingly satisfactory manner. By this method I have had the pleasure of seeing, in my own and other doctors' practice, several limbs saved that were apparently hopeless. There is free drainage constantly by this method, whereas other dressings, no matter how frequently changed, afford imperfect drainage and leave more or less secretion in contact with the wound for absorption.

The parts in the bath are undergoing cleansing all the time, thereby lessening the probability of infection. It facilitates removal of necrotic tissue and revives injured tissue. I have seen structures live that apparently looked hopeless. It is the only painless way of removing clots and foreign substances together with the micro-organisms.

The temperature of the water is kept, night and day, between 135° and 150° F., being gradually raise to this maximum, which is accomplished by a coal oil stove. Hot water is antiseptic, and heat is said to increase the potency of antiseptic substances added to the water. Heat also acts as a hemostatic and is a stimulant; it helps to compensate for the loss of heat resulting from bleeding and traumatic shock.

In railroad and factory injuries, often the wound cannot be thoroughly cleansed; the hot-water bath changes this infected into a non-infected wound; the sterilization is effective and produces active cellular life. When there is a fracture complicating the injury, the surgeon should carefully adjust the parts and the water will act as splints; when pus needs liberating, incise, and if necessary curette.

In the Cincinnati Academy of Medicine, June, 1898, Dr. Horace Whiteacre, in speaking of the conservative treatment of severe injuries, and in all types of spreading inflammation, extolled submersion as a valuable aid in saving limbs and tissue. He said that hot water by direct solution takes up and carries away large quantities of toxic products which are sources of local and constitutional trouble. In submersion the diffusive process is into the water instead of the blood. Water alone is healing. Moisture prevents exsiccation of the secretions and relieves tension. He further states that heat to a surprising degree relieves and brings back to life tissues that otherwise would be hopelessly lost, and an antiseptic added to the bath—such as carbolic acid in a weak solution—would be absorbed into the lmyphatics, and, the tissues being saturated with the solution, the growth of germs at their seat of development is to a great degree prevented; wounds clean up and tissues are saved that seemed already lost. These agents stimulate nutrition, the blood remains fiuid, and the vessel walls normal in the distal portions of an injured or obstructed vessel; the cells live a long time without blood supply; and the use of submersion is based upon the fact that we artificially maintain conditions of heat favorable to the life of the cell until anastomotic circulation can establish itself.

My first experience with this mode of treatment was fifteen years ago. A woman had her right hand caught in a mangle, and all of her hand passed between two large hot rollers. The surgeon who was summoned told the proprietor of the hotel that the hand must be amputated to save life. Neither he nor the woman would consent to the removal of the hand. She was transferred to the city hospital, where she became a patient of mine. The hot-water bath was used, with the result that all the metacarpal bones and the entire thumb were saved. The hand was kept in the bath for about two weeks. I clipped off the phalanges as they exhibited evidences calling for removal, and to-day she is working in the same hotel at the same employment, and has quite a useful hand, with the thumb and metacarpal bones intact.

Permit me to report one of my recent cases, which illustrates the virtues of this treatment: In an accident a freight conductor on the Southern Railway received a compound fracture of the ulna and radius just above the wrist. The end of the ulna protruded nearly an inch; the end of the bone as well as the wound was filled with cinders; the hand was nearly at right angles with the arm. I cleansed the parts as thoroughly as possible and adjusted the bones with the use of chloroform in a perfectly satisfactory manner. In the course of time there was a general cellulitis of the entire forearm and hand; the elbow-joint also became involved, abscesses formed, and all of the cellular planes seemed implicated. I had to make openings in the arm at various places to allow the discharge of pus. The arm and hand had swollen to twice its normal size, and those who saw the case before the injured parts were immersed in hot water had little expectation of the man's life being saved, much less his arm. In less than three months he resumed his work with a reasonably good arm and hand.

Before closing I desire to give extracts from a few medical journals with regard to the hot-water treatment.

The May number of the Medical Times quotes a new and simple method of treatment, which was introduced in France, for the saving of injured limbs which are usually amputated. Dr. Reclus had recently described it before the French Congress of Surgeons. He advocates wrapping the limb in an antiseptic

substance and hot water at the temperature of 140° to 144° F.

The Northwestern Lancet describes "Hebra's bath," which also illustrates the usefulness of hot water. In the hospital in Vienna is an establishment devoted to the treatment of affections by prolonged and continuous submersion of a part or the whole body in water. Here patients pass weeks, months, and even years continuously in the water, never leaving the tub except for the purpose of evacuating the bowels or bladder.

These patients seem quite as comfortable and as cheerful as those who pass their time in beds in the wards. The temperature of the water is regulated according to the sensation of the patient, the contents of the tub being changed three times a day, except in cases where there is much discharge of pus or other matter, when the water is changed oftener. None of the organs of the body appear to suffer by long submersion in water, even the skin itself being but a little affected by the maceration.

The diseases for which this method of treatment is adapted are those where there is considerable loss of the integument, as in exfoliating pemphigus, extensive bed-sores, gangrene, wounds involving great loss of skin, and burns of great extent where it is impossible for the victim to assume a position which does not cause agony from pressure. The relief of the bath under such circumstances is marked, and the treatment often saves life that must otherwise be lost from shock and suffering under methods of management.

The value of hot water has been so clearly demonstrated that it is surprising that every hospital does not provide accommodations for treating patients by this method. Extensive burns alone are common enough to justify preparation for their management in this way, to say nothing of other troubles.

I trust with these brief remarks, and the knowledge that cleansing and drainage are the key-notes in surgery, that the valuable therapeutic action of hot water will be used more generally.—Med. Age.

A New Operation for Hernia.

By Emory Lanphear, M. D., Ph. D., St. Louis, Mo.

Having had three patients with whom complete atrophy of the testicle followed the Bassini operation for inguinal hernia, and some recurrences when the Czerny and the Macewan methods were adopted, I, some three years ago, decided to try a plan which I felt certain would prove successful, since by it total obliteration of the inguinal canal would be obtained. Experimentally the chief objection to the plan has been the reluctance of patients to accept the proposed procedure; so that thus far I have succeeded in securing but three cases. These have, thus far, been entirely satisfactory in their history subsequent to the operation.

The method is as follows: A large flap is turned back, exposing the hernial sac and the inguinal canal in their entirety. The sac is then carefully dissected out, opened and contents reduced. At this stage the opening into the abdomen is closed with gauze and the spermatic cord and testicle lifted out of their natural position, and enveloped in iodoform gauze. From the hernial sac (parietal peritoneum) there is now made a pouch, or artificial tunica vaginalis testis, into which the testicle and cord are passed and enclosed with catgut sutures in such way that not too much pressure is possible upon the cord; the whole pushed into the abdominal cavity, and anchored by a few catgut sutures. The cut in the peritoneum is next closed; next the opening into the scrotum sutured; then each muscular layer of the abdominal wall carefully sutured, completely obliterating the canal—just as is done in operating for inguinal hernia in the female.

That the ultimate fate of the buried testicle is atrophy I cannot dispute, as no opportunity has yet presented for postmortem examination; that it is possible I cannot deny. From a surgical standpoint the chief objection to this operation is that a suppurative orchitis or epididymitis might necessitate abdominal section; but suppurative inflammation of these structures is so comparatively rare that this danger can scarcely outweigh the advantages to be gained. Thus far only the most gratifying results have been noted.—Amer. J. Gyn. and Surg.

Alcohol as an Antidote to Carbolic Acid.

Dr. A. M. Phelps says:

From personal observations and demonstrations in the use of pure carbolic acid followed by the use of alcohol, I can state to the profession positively that we have in alcohol an absolutely safe and sure specific against the escharotic action of pure carbolic acid. And I believe that this fact should be given wide publication to the profession and even to the laity, because in cases of carbolic acid poisoning with homicidal intent, if, immediately after the administration of the poison, alcohol was thrown into stomach of the individual, the poisonous effect of carbolic acid would be at once neutralized.—N. Y. Med. Jour.

Annual Meeting at Richmond, Va., May 31, June 1 and 2.

Notices and Reviews.

An American Text-Book of Diseases of the Eye, Ear, Nose and Throat. Edited by G. E. de Schweinitz, A. M., M. D., Professor of Ophthalmology in the Jefferson Medical College, Philadelphia, and B. Alex. Randall, M. A., M. D., Ph. D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania; Professor of Diseases of the Ear in the Philadelphia Polyclinic; and assisted by 58 Collaborators. Royal octavo, 1,255 pages. Illustrated. Philadelphia: W. B. Saunders. Chicago: W. T. Keener. Price, cloth, $7 net; sheep or half morocco, $8 net.

This admirable volume conforms in size and excellence with its predecessors in the "American Text-book" series. Of its 1,255 pages 53 are devoted to the introduction and index, the latter being one of the special features of the book to be commended on account of its completeness, consisting, as it does, of 37 pages of closely printed matter, three columns to the page. A separate index of authorities referred to is omitted, which is to be greatly regretted. Another omission, though of less importance, is the usual list of illustrations. Of the remaining 1,202 pages 602 are devoted to the eye, 190 to the ear and 410 to the nose and throat, and are divided up in 36 chapters for the first, 13 for the second and 20 for the last of the three sections, making 69 chapters in all.

The book is printed upon heavy, glazed paper, so as to permit of the reproduction of half-tones, and in its general make-up, from a typographical standpoint there is nothing wanting. The pages are slightly larger than those in Burnet's "System," giving a liberal margin for notes. Owing to its size and weight a possible criticism is that the work had better have been divided into two volumes, with independent indices, thus making the eye section a separate book. This course has been pursued by the publishers of the English edition.

The illustrations are to be particularly praised, being almost entirely new, and are representative of the highest grade of the artist's skill. While the publishers, upon the title-page modestly lay claim to only 766 engravings, there are by fair count no less than 917, of which number 62 are in colors, and 15 are full-page plates. Tables to the number of 48 are also introduced.

In the preparation of this work the editors have been ably assisted by 58 collaborators, all being specialists of national reputation, and each one particularly qualified to write upon the subject assigned him. Of these sixty contributors eight have written two chapters each, while three chapters each were furnished by two. Of the remaining writers each one has contributed one chapter, excepting in three instances, wherein a chapter was written by two authors jointly. Through careful editorial supervision repetitions are rare and differences of opinion not often found. In fact, individual opinions have to a large extent been made secondary to accepted facts. Cross references are frequently entered and occasionally an editorial comment in the form of a note.

There is always an excusable difference of opinion as regards the comparative merit, on the one hand, of a systematic text-book by one writer, and, on the other, of a system consisting of a series of papers by several writers. While in the former a continuity of thought prevails which does not exist in the latter, still it must be allowed that as a reference work of the greatest value to specialists the latter gives a pronounced advantage, as the subject sought for is in each case treated by the master hand of one who has given it prolonged and special study. Of course, on the other hand, while a work of such character must necessarily be guilty of omissions, they are generally of such a nature as to be of no disadvantage to one not a beginner. In this work will be found the nearest possible combination of the two styles being considered as the elaborate index, and the numerous cross references given, amend to a large extent any lack of continuity apparent.

In the first part every phase of the eye and its diseases is fully considered by 32 contributors. To the subjects of embryology, anatomy, physiology and the general principles of optics are devoted 125 pages and 100 pages to examination and refraction. Particular attention is given to the consideration of color blindness and additionally one chapter is devoted to each of the following subjects, which may be considered novel: The Roentgen Rays in Ophthalmic Surgery; The Practice of Ophthalmic Operations on Animals' Eyes, and

the Relationship of Micro-organisms to Ocular Disease.

In the second part the ear is quite fully considered by 14 contributors. The one colored plate in this section, showing in 24 figures injuries and diseases of the drumhead, is particularly good.

In the third part 19 authors treat the nose and throat from anatomic, physiologic, pathologic or surgical standpoints. The chapter by Farlow on Examination and Diagnosis is clear and practical. The same may be said of the chapter by Leland on Therapeusis and Prognosis. Newcomb devotes 36 pages to a very complete resumé of Diseases of the Pharynx and Tonsils, though he fails to describe some of the later methods of operating upon chronically diseased tonsils of adult life. The section by Wright upon Neoplasms must be specially mentioned, as it is a classical production. The several chapters in both this and the ear section are thoroughly up-to-date, as well as those in the eye section. As a whole the work is highly meritorious and quite fully represents the latest and best ideas in the field covered. EDWIN PYNCHON.

Personal.

Dr. Geo. Wall of Cottage Grove, Ore., has been appointed local surgeon for the S. Pac.

Dr. W. T. Hayes has been appointed surgeon of the Columbia & Western Railway at Rossland, B. C.

Dr. G. M. Foster has been appointed surgeon in charge of the railway hospital at Grenwood, B. C.

Dr. B. L. Steeves of Huntington, Oregon, has been appointed chief surgeon of the Northwest Railway Company.

Dr. H. M. Taylor of Richmond reports another successful case of suture of a typhoid perforation in the Nashville Medical Journal for April, 1899. The record now stands 61 operations, 14 recoveries.

Never forget that early openings are imperative in abscesses situated: 1. In the neighborhood of joints. 2. In the abdominal wall. 3. In the neck under the deep fascia. 4. In the palm of the hand. 5. Beneath periosteum. 6. About the rectum-prostate and urethra.—Fenwick.

Annual Meeting at Richmond, Va., May 31 June 1 and 2.

Railway Miscellany.

Railway Life as a Career.

The April issue of New York Railroad Men contains a number of expressions of opinion from well-known railway officers in reply to the following list of questions:

1. What are the present opportunities for young men in railway life?

2. What effect does the tendency to consolidation in railroads have upon such employment?

3. In your opinion, what department of the railway service gives best promise of success?

4. What kind of training will furnish the best preparation for success in railroad life?

There is remarkable unanimity in replies to the first question, as to the opportunities for young men in the service. What the tenor of these replies is the following extracts will show:

Roswell Miller: They are better than they have been.

W. H. Truesdale: As good as they ever were for the right kind of men.

E. T. Jeffery: Better than ever before.

G. L. Bradbury: Better than ever before.

John F. Wallace: Better than they have ever been.

J. M. Barr: Were never brighter.

C. H. Chappell: Competent men always in demand.

Russell Harding: Never better or brighter.

G. W. Stevens: Very good.

F. D. Underwood: Under certain conditions, better than ever.

As to the effect of consolidations on employes the almost universal testimony is that there is practically none. Consolidation, of course, has a tendency to reduce the number of highly paid officers, but nearly all those who reply to the question do not think that it affects the employes in general. An interesting suggestion by Mr. Harding is that "the tendency on young employes or officers is to push them forward, older officers being caused to give way for young, energetic men."

As to the best department for young men to enter, there is difference of opinion. Messrs. Miller, Truesdale, O. D. Ashley and Harding, for instance, prefer the traffic department, while Messrs. Jeffery, Barr, Underwood, W. G. Van Vleck and others recommend the operating on mechanical sides. The majority, however, say, in one way or other, what seems to us to be undoubtedly the truth, that it depends largely on the young man himself and the bent of his abilities and inclinations.

In regard to the best kind of training, "a good common school education, coupled with

the right kind of home training and influence," which are Mr. Truesdale's ends, express the opinion of the majority. Some few speak of a college education or of a course in a technical school, while many point out that the real training only begins when the young man enters railway service, which is itself the best and surest school.

Altogether, the "symposium," as it is called, is interesting. It does not develop any thing especially new; but the unanimity of opinion as to the excellent opportunities which the service offers, and above all, the wholesome insistence in the need of a sound, even if elementary, education, coupled with the good principles which result from the right home influences, have a note of distinct encouragement and good cheer.

Education of Trainmen in First Aid to the Injured.

C. N. O. & T. P. Ry. Co.,
Lexington, Ky., March 23, 1899.

To the Editors:—A brief description of the methods in vogue on this line in the education of the trainmen in "First Aid to the Injured" may interest your readers. The necessity for such knowledge on the part of the trainmen, we assume, is admitted by everyone connected with the operation of a railroad. Therefore, it will not be necessary to discuss this feature of the case.

The duties of trainmen on all railroads, especially those in the freight service, are, to say the least, hazardous. For this reason, the management of this line has considered it advisable, not only in the best interests of the employes, but in the interest of humanity, to educate the trainmen in a general way as to the first aid to the injured. Train employes on all railroads are at times injured, perhaps at night, when immediate assistance cannot be procured, or at isolated points miles away from a surgeon, and it is in the effort to teach the men how to act and to act promptly in such emergencies that arrangements have been made with the railroad surgeons along the line of this road to deliver a course of lectures to the trainmen at stated intervals at various points on the road on the "First Aid to the Injured," and in this way endeavor to impart sufficient knowledge to enable them to act intelligently (until the arrival of a surgeon) in cases of injuries that might otherwise result fatally by reason of hæmorrhage.

Our men have become greatly interested in these lectures and they do not hesitate to ask the surgeon to more thoroughly explain when they fail to comprehend. In addition to illustrating the lectures by various charts, the surgeon has a subject before the class, generally a mulatto, nude, which enables the surgeon to more fully explain and the men to more readily undertand. The surgeon applies bandages, the tourniquet, etc., to the subject in the presence of the men. Then the surgeon, in order to ascertain if the men fully appreciate the conditions and how to apply the bandages, etc., calls upon the men to personally apply them to the subject, and in this way the men become, in a measure, expert in the application of bandages, etc.

At the different terminals, freight yards, and in the tool or what is known as the "wrecking car," ambulance chests are kept fully equipped with muslin bandages, cotton (absorbent and carbonated), adhesive plasters, sponges, vaseline, tourniquet, scissors and all the other necessaries for a complete emergency outfit, so that they can be readily resorted to in case of need.

With each chest are the following printed instructions:

"Arrest bleeding from wounds by pressure with a sponge moistened with cold or very hot water; if the loss of blood is considerable, apply the tourniquet. The pad of the latter must be applied to the inner side of the arm below the shoulder, in the injuries of the arm; to the front surface of the thigh, below the groin, in those of the leg.

"In small, clean-cut wounds, bring the edges together with strips of adhesive plaster; in wounds more than an inch in length, unite the edges with stitches.

"If the wound is ragged and torn, clean it as thoroughly as possible; then cover it with vaseline and a thick layer of cotton. Fix this dressing by applying a bandage as even as possible and with moderate firmness.

"When a limb is evidently broken, place it in as natural a position as possible until the local surgeon of the company can see the patient.

"JOSEPH RANSOHOFF, M. D.,
"Chief Surgeon C., N. O. & T. P. Ry."

The present plan is also to equip all freight cabooses with small ambulance chests, so that in cases of employes injured where medical aid cannot be promptly had, the men will have at hand what is necessary in the emergency, as a temporary measure, and are enabled to act understandingly as the result of the knowledge gained from the lectures.

Without going further into details, the above will give a general idea of the method. It is not the intention to make surgeons of the train employes, but it is the desire of the management to have imparted to them sufficient knowledge to enable them to act promptly and effectively in cases of injury when a surgeon is not at hand.

W. J. MURPHY.

[This letter was written and mailed before Mr. Murphy could have read our article of

last week on this same subject. The coincidence is curious. We have already expressed our belief in the great importance of the subject.—Ed.]

The New Railway Association.

The first meeting of the American Railway Engineering and Maintenance of Way Association is in session at Buffalo as we go to press. Telegrams from the representatives of the Railway Age at the meeting inform us that the constitution, extracts from which were published in our issue of last week, was yesterday adopted without discussion. Seventy applications have been received for charter membership, including the representative officers of most of the leading railways of the country. The first formal election of officers resulted as follows:

President—J. F. Wallace, Illinois Central.

Vice-Presidents—P. A. Peterson, Canadian Pacific, and W. G. Curtis, Southern Pacific.

Treasurer—W. S. Dawley, Chicago & Eastern Illinois.

Secretary—L. C. Fritch, B. & O. S. W.

Directors—W. H. McFarlin, C. R. I. & P.; H. McDonald, N. C. & St. L.; D. J. Whittemore, C., M. & St. P.; F. H. McGuigan, Grand Trunk; A. Torrey, Michigan Central; Thomas Rodd, Pennsylvania Company.

An association which starts with a board of officers such as the above, so excellently representative of the railways of the country, ought to be able to make itself a power for good in the railway world.

Marks and Remarks.

Prescott, Ariz., February, 1899.

To the Editors: Of course, you are familiar with the ordinary form which is filled out by an applicant for employment in train service or the mechanical department, covering personal record, etc. It occurred to me that the following might amuse your many readers.

A man recently applied for a position here as locomotive fireman. After filling out the blank, stating his age, whether married or single, where born, relatives, etc., he turned over onto the back of the blank, at the top of which is printed: "Remarks by head of department in which applicant is employed." After studying over this for some time he concluded that he ought to say something, which he did as follows:

"I have no marks on head or boddy."

R. E. W.

The Chesapeake & Ohio Railway has a system of sanitary inspection and discipline of employes which is unusual and which is under the direct charge and supervision of the chief surgeon, Dr. C. W. P. Brock of Richmond, Va. Under this system special care is taken to preserve the yards, stations and other buildings of the company in perfect sanitary condition. The water closets, drainage, water supply, etc., are carefully investigated and special attention is given to the water which is placed in cars for drinking purposes. This system of inspection is designed with a view to preserving the health of both the employes of the company and the traveling public which uses the line.

The French papers—as, for instance, Figaro and the Journal des Transports—are much exercised over the question whether an automobile is masculine or feminine—"he" or "she." The matter of sex is always important in France, and the people suffer many inconveniences because they are too romantic to have a neuter gender. With us "it" or "the d—d thing" is good enough for an autocar.

A somewhat similar embarrassment is being felt in London, where the electric automobile is making immense inroads on the business of the ordinary hansoms and "growlers"—as the London four-wheeled cab is called. What are the new vehicles to be named? "Horseless cab" is regarded as altogether too ponderous, especially as it is generally believed that the great majority of the cabs will soon be horseless. An attempt was made to introduce the name "whizzer," in jocular reference to the noise which the new vehicles make; but Punch has come out as an advocate of "mover"—and Punch is powerful in such matters. Meanwhile, the things are content to go unnamed and keep on doing business.

A bill has been introduced in the Pennsylvania legislature to regulate the charges for accommodations in sleeping and palace or chair cars, as follows: For a seat in a palace or a chair car, not more than 25 cents for the first 125 miles, and an additional charge of 25 cents for distances in excess thereof up to 350 miles, and an additional charge of 25 cents for each additional 100 miles thereafter; for each berth in a sleeping car, 50 cents for a distance of 350 miles and 50 cents for each additional 100 miles thereafter; for each seat in a sleeping car, 25 cents for the first 150 miles and 25 cents additional for the next 200 miles and 25 cents additional for the third 250 miles.

All of the principal stations on the Pennsylvania lines west of Pittsburg are to be connected with the general offices at Pittsburg by long-distance telephones.

THE Railway Surgeon

VOL. V. CHICAGO, MAY 16, 1899. No. 26

GENERAL EMPHYSEMA—A CASE.*

BY F. R. GARLOCK, M. D., RACINE, WIS.

The subject of emphysema is one not often written upon as a separate disease, as it is more a symptom of some other lesion than a disease of itself. Its rarity gives it a value, for we do not often see a case, especially in the diffuse form. There are two or more varieties of this disease—the idiopathic and the traumatic. The former occurring in the course of some lung or bronchial disease and the latter supervening upon some traumatic lesion, as, for instance, a penetrating wound of the chest.

It was my good fortune to see such a case on the 20th of last September and to be able to observe its progress and to have a positive knowledge as to how the disease originated. It was a genuine case of general emphysema, i. e., one affecting the entire surface of the body. The disease in this form is very rare, and but few cases have been reported, and then in text-books for the purpose of illustration, to account for its occurrence and to point out a treatment. Such a case is well illustrated in Vol. II of Gross' System of Surgery. The case which I saw was as follows:

On a Sunday afternoon a son of Mr. B., who resided upon his farm, in the town of Mt. Pleasant, Wis., ran down the sloping bank of a small brook on which a very rank growth of rag weed had sprung up, which had been recently cut with a scythe. In running the boy, a lad of some 11 years of age, fell, striking his right side upon the point of one of the stubbles. The wedge-shaped point, about half an inch in diameter, entered the chest between the fourth and fifth ribs, at a point about two inches posterior to the right nipple, passed through the chest wall, both folds of the pleura and entered the lower lobe of the right lung, making a valvular opening. It caused but little hæmorrhage at the time nor did it bleed much afterward. As he breathed the air escaped freely through the external wound at each inspiration. The friends and parents, fearing much loss of blood and being anxious to do all they could for his relief, applied a piece of adhesive plaster over the external wound. This was done only a few moments before my arrival.

Upon entering the house my attention was called to the swollen condition of the chest to the extent of a few inches from the wound. They informed me that this swelling had only began since they applied the plaster over the external opening. I observed the surface of the chest and saw that the swelling was advancing rapidly. My curiosity being excited, and knowing that I should have no better opportunity to observe a case of general emphysema than this case presented, and the filling of the skin with inspired air being harmless, I, therefore, awaited results. It advanced over the whole body from the point of penetration in the chest until it had extended to the feet, upward to the scalp, and down the arms to the fingers. The face, genitals and ears were enormously distended. All this time there had been no symptoms of disturbed respiration or circulation. After the skin was filled to its greatest extent the chest cavity began to fill up and the breathing became labored, the face and surface began to be cyanosed and the experiment had gone as far as I considered it safe. To relieve the symptoms I removed the plaster from the wound and the air began to escape from the opening with a whistling sound. I then applied a roller bandage over the legs from the feet upward, which completely expelled the air from them. By rubbing the surface of the body the air was driven out of the wound with ease and upon

* Read at the sixth annual convention C., M. & St. P. R. R. Surgeons. Chicago, November, 1898.

pressure a distinct crackling sound was heard as the areolar tissue was broken down in the passage of the air outward. This rubbing was continued for a time over the entire body and head, and to lessen the force of the circulation and respiration a full dose of opium was administered and there was no more bleeding nor did the air escape through the wound in the chest.

I then left him, and upon my return next morning there was but little evidence of any general emphysema. Before leaving I placed strips of adhesive plaster on the sides of the chest just below and above the wound, which, together with a soft dressing of carbolated gauze, was sufficient for the night. This case is not presented because of any great skill manifested in its management but on account of its rarity, there being no case of its kind mentioned in the Railway Surgeon, or other journals which have come under my observation. This is my only excuse for presenting it at this time.

DISCUSSION.

Dr. Stewart: What do you suppose would have been the result of the case had been allowed to go on indefinitely?

Dr. Garlock: I think the accumulation of air in the chest would result in the formation of pneumothorax, and respiration would be interfered with sufficiently to destroy life after a while.

PRIMARY AND MULTIPLE AMPUTATIONS.*

By H. H. Clark, M. D., McGregor, Iowa.

It has, gentlemen, afforded me not a little pleasure to examine the literature at my command upon the subject of multiple amputations, and incidentally the history of surgical procedures generally. To note the crude methods called "modern" a hundred years ago and comparing the methods then employed with surgery as it was forty years ago, shows a wonderful advance, while the surgery of 1898 compared with forty years ago gives us an example of progress and advancement such as cannot be found in any other department of art or science.

*Read at the sixth annual convention C., M. & St. P. R. R. Surgeons, Chicago, November, 1898.

In looking over a volume on surgery published as late as 1853, I find the following:

"Some wounds are so extensive, so complicated, so peculiar, so hazardous to life, if the injured part is allowed to remain on the body, that amputation is the proper course of procedure. * * * Severe compound fractures and dislocations, extensive gunshot injuries, lacerations by machinery and other such examples, often demand this operation. In which event the wound left on the body, though perhaps comparatively of great size, is always of a less formidable character."

It is a maxim almost universally applicable, never to amputate while a patient is suffering from shock. This exposition of a very important subject necessarily leads to the conclusion that with the aid of antiseptic methods we are now able to save limbs which in the pre-antiseptic era would have fallen a prey to the mutilating effect of amputation, and that not only are limbs saved, but there is a marked decrease in mortality, and it must be ascribed solely to the aseptic methods of treating wounds.

The first case to which I will call your attention is that of J. A. M., 36 years old, North McGregor, Iowa. He was employed by the C., M. & St. P. Ry Co. as a car repairer, and on March 15, 1896, while attempting to cross the tracks at North McGregor was caught by a switch engine, thrown to the ground, and the wheels of a loaded car passed over his right leg and arm, comminuting the bones of both leg and arm, and pulpifying the soft parts of the leg to about the middle and the arm to within about four inches of the elbow. A message was sent to me, and he was taken to North McGregor, a distance of about one mile. I arrived at the same time he did, 25 minutes after he was injured. I immediately placed him in a wagon and had him taken to his home, a distance of about half a mile. In less than thirty minutes I had made all the necessary preparations for amputation, gave him about two ounces of whisky, anæsthetized him with ether, applied an Esmarch bandage to leg and amputated, making an anterior skin and posterior musculo-tegumentary flap, section of bones at about the junction of the upper and middle thirds. I then, without closing the wound, amputated the arm, using circular method, about three inches below the elbow-

joint. The edges of the flaps, the leg first, were accurately apposed with silk, dressed with salve, covered with iodoform gauze and tightly bandaged—no drainage tubes were used. I then surrounded him with hot water bottles, and several hot water bags and gave him a hypodermic injection of morphine.

The accident occurred at 10.30 p. m., and I left him at 12.20 in a comparatively comfortable condition. During the first four days his pulse ranged from 85 to 105, never after the first twenty-four hours over 100. The dressings were not disturbed until the seventh day and he suffered but little pain. Upon removing dressings I found both stumps in excellent condition, no pus or discharge of any kind except a slight serous discharge from arm. I removed the sutures and applied three or four narrow strips of adhesive plaster to both arm and leg, and gave it a dry, snug dressing. From this time I dressed them daily, but never using a drop of water except to wash the limbs above the stumps. Primary union was gained and on the eighteenth day both wounds had entirely healed. The ligatures of the arm were removed on the fourteenth and of the leg on the fifteenth day.

He remained in bed but ten days. On the twenty-fourth day commenced using crutches and called at my office on the twenty-sixth day after the accident. At the end of four months he had secured an artificial leg and the company sent him to Evanston and placed him in charge of a crossing and he has been an efficient flagman there up to the present time.

The points thought worthy of mention in this case are the slight amount of constitutional disturbance, following such grave injuries, and the rapid healing of the stumps. The promptness with which the operations were performed, less than two hours having elapsed from the time of injury until the completion of the operations, the excellent constitution of the patient and the fact that the dressings were not disturbed for seven days I consider the important factors in the unusually favorable result.

Case II.—A 8.30 p. m., August 6, 1896, a message came to me that a young man had been run over at a crossing and that both legs and one arm had been cut off. I reached him not to exceed 15 minutes after the accident and directed him to be carried to the town hall. Upon examination found the left hand and arm pulpified and nearly severed at junction of middle and upper thirds. The left leg also pulpified and almost severed midway between ankle and knee. I also found the muscles of the right leg were undeveloped as a result of scarlet fever when a child. This leg had sustained a compound comminuted fracture of tibia, which was protruding about three inches above ankle-joint, and a fracture of the fibula at junction of middle and lower thirds. I immediately gave him a large dose of whisky and made preparations to operate.

The leg was amputated about four inches below the knee and the arm about three inches below elbow, using the circular method in both limbs. The leg was not dressed until the arm had been amputated, and then both were dressed in the same manner as in the case just reported. I then washed and cleansed the fractured leg, gave it an iodoform dressing and enveloped it in a splint made by folding up an ordinary bed-quilt. Completed the work at 10 p. m., just one hour and thirty minutes after the accident. The following day I placed the fractured leg in a plaster-of-Paris dressing.

This unfortunate was 16 years old and had been on a tramping tour. He reacted nicely, and the next morning not only ate a hearty breakfast, but smoked a cigar with apparent relish. The dressings were not disturbed until the seventh day, when they were removed. The arm stump was found in excellent condition. The sutures were removed and several narrow strips of adhesive plaster applied and redressed as before with a moderately snug dressing. The wound healed without sufficient discharge to more than slightly stain the gauze, the bandage remaining clean and white. The stump of leg was found to be somewhat enlarged, and upon separating the flaps a liberal amount of bloody serum, not in the least offensive, escaped. There was no effort whatever in the way of repair. Doubtless the insertion of a drainage tube would have been a wise procedure in this stump. I irrigated the wound thoroughly with bichloride and followed this up daily until the end of the third week. The arm having entirely healed in the meantime, I now opened up the wound and found the end of tibia necrosed, removed about three-quarters of an

inch, closed the wound and trusted to luck. Repair began at once, and with the exception of a slough of skin, about three-quarters of an inch in diameter, the wound healed nicely.

The wound of right leg healed without suppuration, and the union of fracture was as rapid and satisfactory as could have been desired. I sent him to his home thirty-five days after the accident in the following condition: Union of fractures, arm entirely well and leg (with the exception of a spot about as large as a nickel on anterior surface in a nicely granulated condition) entirely healed. I advised him to call in Dr. Staples, who would at the proper time remove the plaster dressing and look after the unhealed surface.

I did not hear from the boy until the 16th day of September, just forty days after the accident, when I was favored with the following interesting letter:

Dr. H. Clark—Sir: I guess I will have to write to you concerning my leg. Dr. Staples is not tending to it right. He calls about every day and every time he comes he brings some different doctors with him. What I think is he wants to make a little study of this. I have got sick of him and I want you to come down right away, for I don't want a good job spoiled by a good-for-nothing doctor. If you take the 3.20 train you will arrive at Dubuque shops at 5 p. m., where you will be met by my father. Yours truly, * * *

I met Dr. Staples a short time after receiving this communication. The doctor said the young man had partly, at least, stated the truth. That the fact was he had him on exhibition as a natural curiosity.

The points thought worthy of mention in this case are: First, the fact that the boy had been tramping, was dirty and poorly nourished, and the fact that the conditions surrounding him were the most unfavorable after the operation and throughout the treatment. Second, the prompt manner in which he reacted, slight constitutional disturbances following the operations, the rapid healing of the arm and fractured leg, the fact that repair did not begin in the leg stump until the arm and right leg had practically healed, and the uninterrupted manner in which the leg healed after the second operation. The prompt manner in which the operations were performed, an hour and a half only elapsed from the time of injury until the injured limbs had been dressed, I consider the important factor in the favorable result. I have not mentioned cleanliness or antiseptics, for the reason that almost every report of this kind is accompanied by a minute description of all antiseptic measures employed. I will, however, add that a reservoir at the railway eating house always contains a supply of boiled water and that my emergency case contains boric and carbolic acids, bichloride of mercury, alcohol, iodoform, iatrol, antiseptic gauze and bandages and that I make a liberal use of them.

Case III.—On the 3d day of June, 1897, I received a message to the effect that a man had been injured near Monona (fourteen miles from McGregor), that he was on his way and that I was to meet him on arrival.

Dr. Thornton, who was in my office when the message came, accompanying me, we responded at once, and upon his arrival we learned the injured man was 18 years old, that he lived in Prairie du Chien and he was determined to go home. We returned to McGregor and in about two hours a message was received to the effect that in consequence of a very high wind the pontoon bridge could not be closed, and for this reason the young man must be cared for here. We had him taken to the town hall and found the left foot and leg crushed to about the middle third, a very severe compound comminuted fracture of the left hand and wrist, and a severe scalp wound in right parietal region about six inches in length. After administering stimulants Dr. Thornton etherized him and we amputated the leg four inches below the knee. The hand and wrist, having been flattened to almost double its normal width, was moulded into shape as nearly as possible and the wound sutured, twenty-four sutures being used. The scalp wound was also sutured and dressed.

Seven days after the operation I removed the dressings and found the stump in a gangrenous condition, while the hand appeared to be in good condition and the scalp wound healing nicely. On the eleventh pain and swelling appeared above trochanter-major. I made an incision at least six inches in length and removed at least twenty ounces of clotted blood. The cavity was thoroughly irrigated with a bichloride solution, as was also the stump. This treatment was followed daily

until the 22d, when I amputated above the knee. Removed dressings on the fourth day and the stump had a very satisfactory appearance. On the sixth day gangrene again appeared, a profuse offensive discharge followed and he died on the 6th day of July, thirty-three days after he was injured.

We had in this case a good example of embolic, spontaneous gangrene, and had to contend with a deep and general intoxication of the system, doubtless due to the absorption of ptomaines. The processes determining phlegmonous destruction progressed beyond the highest limit of amputation, and securing an aseptic state of the leg was impossible.

No amount of irrigation was of value, and although I removed, as I supposed, most of what was a source of infection, I had a profuse secretion of pus, containing no doubt an extremely virulent culture of micro-organisms, a few individuals of which we are taught are sufficient to start another phlegmon. This case has not been reported as double or multiple amputation, but, as Dr. Thornton will corroborate, the advisability of amputation of hand was seriously considered.

The interesting points in this case are the following:

About five hours passed from the time he was injured before the operations were made. The hand and wrist healed without suppuration, and there was but little discharge of any kind. The sutures were removed on the tenth day, the wound having healed by first intention. The sutures were removed from scalp on the ninth day, and this wound, too, healed without suppuration. In my opinion had the patient been operated on promptly after the in juries, his chances for recovery would have been much better.

Case IV.—On the 16th day of June, 1897, Peter H., deaf and dumb, 79 years old, while walking on the track, was caught by passenger train and his left leg crushed and nearly severed above the knee. He was picked up and carried to North McGregor, a distance of twelve miles. A message was sent me to meet him on arrival. I arrived a few minutes after the train and found him suffering somewhat from profound shock. I administered stimulants and had him taken to a vacant room in the immediate neighborhood, and in less than thirty minutes amputated about four inches below the hip. On the 7th day of August, twenty-one days after the accident, the wound was entirely healed, not a drop of pus or discharge of any kind except a very small amount of bloody serum followed the amputation, and I sent him to his home on the 7th in excellent health and spirits, and when I last heard from him a few months ago he was reported in robust health. In this case there was less shock after the amputation than before the administration of ether.

I have briefly given this case for the purpose of asking a question or two. If I had waited for reaction or for a favorable time to amputate, would the man's chances for recovery have been any better? Don't you believe that if I had done so he would have died? Do you happen to remember a 79-year-old patient who survived amputation near the hip-joint?

One author tells us that "when the necessity for multiple amputation arises, the question must be considered whether they should be made at the same time, when they are called synchronous amputations, or whether a longer or shorter interval should supervene between them." Another says: "In cases of trauma it is generally advised to make both amputations at the same time, removing the largest member first, but deferring the closing of the wounds until both amputations are completed." This practice I have followed.

Still another says: "If after the first amputation the condition is such as to preclude the possibility of recovery if the second is performed at once, the less injured member must be treated, as if the injury sustained by it were of less degree of severity, and justifies an attempt at conservatism."

This, to my mind, is nonsense, for the reason that if from shock an operation is not likely to result successfully neither should be operated upon. Another tells us that an amputation of a limb for railroad crush should not be made for at least twelve hours after the accident, to avoid all possibility of shock, the injured part being in the meantime treated antiseptically.

Says another authority: "The necessity for amputation being answered in the affirmative, we have then to determine at what time the operation should be performed, during shock or the period of reaction. Consideration of this question is of the greatest moment to the

patient. Postpone a resort to the knife until there is satisfactory evidence of reaction, until, in a word, warmth and color return to the surface, and the pulse beats vigorously at the wrist." Another celebrated author gives this advice (which I am prepared to endorse) that the period of reaction is the best point of time for amputation, and that the immediate period of shock is not the best, but that, on the contrary, it is an eminently dangerous period.

Some years ago this organization somewhat exhaustively discussed the subject of primary and secondary amputations, and Dr. Murphy of St. Paul, at that time, if my memory serves me right, surgeon-in-chief for the Northern Pacific Railroad, advocated in vigorous language the advisability of, in all cases of serious injury, loading the unfortunate into a caboose or coach and taking him to a hospital, where he was sure to have good treatment. I did not quite agree with the doctor at that time, and believed he was not so much of a secondary amputation advocate as he was "after de coin."

I have, gentlemen, deliberately reached the following conclusions: In the first place, hæmorrhage is the chief factor of shock, and prevention of loss of blood is most essential, and that if profuse hæmorrhage has not occurred before taking charge of a case, this element of danger may to a large extent be eliminated, and that in all cases of shock where little hæmorrhage has occurred (and this is true in a very large per cent of railroad accidents), the administration of ether lessens or lulls the first shock, and when the crushed and mangled parts are removed the second shock is not so great and easier to rally from. In the first two cases given, I am positive that the administration of ether lessened the shock, and that the patients were in better condition after than before the operation, and I am quite sure Dr. Thornton will corroborate what I say when I tell you that the same was true in the third case.

DISCUSSION.

Dr. W. S. Caldwell: As Dr. Clark has referred to me, I wish to say a few words on this paper. The practice of medicine is a sad and solemn one from first to last, and I am very glad, though it is at my expense, that Dr. Clark got a little merriment this morning. It seems to do him some good, and does me no harm.

With reference to the paper, there are one or two points in it with which I thoroughly concur. The first is, that all wounded surfaces I dress dry and then let them alone. Dr. Clark's idea is to dress them and let them alone unless there is something the matter. If you have elevation of temperature in any case, or any constitutional disturbance, do your best. The doctor, I think, uses bichloride of mercury for the purpose of disinfecting the stump, and with that exception I entirely agree with his treatment of primary and multiple amputations.

Dr. Thornton: A few years ago I had occasion to attend a brakeman who was injured in the yards about 7 o'clock in the morning. I reached him about fifteen minutes after the injury had occurred, found him on a cot in a railway van with one limb crushed near the knee from the wheels of the tender passing over it. I immediately asked a gentleman to telegraph for Dr. Clark, for the reason that he would reach there on a train within an hour and a half, and another reason I sent for a railway surgeon to assist me was because two local physicians, if they ever got a chance to involve the railroad, they would pump it into them good. I used bichloride of mercury solution and prepared the patient for amputation. At about the time I was ready to perform the amputation Dr. Clark had arrived, and then the amputation was made within two hours after the injury. Ether was administered as an anæsthetic, and disarticulation at the knee-joint made. The man rallied from the ether well; he had no bad effects afterwards; no rise of temperature. The stump was dressed with the usual iodoform dry dressing, and the dressing was not removed until the sixth day.

Dr. W. T. Nuzum: There was one remark made with reference to shock being caused by hæmorrhage. I have seen patients severely shocked where there was no hæmorrhage. The nervous impression is a far more important factor in shock than loss of blood in the majority of cases.

Dr. Clark (closing the discussion): I do not know that there is anything for me to say particularly. So far as hæmorrhage is

concerned, I said it was the principal factor of shock. I understand that we can have profound shock without hæmorrhage, but in these accidents there is always more or less hæmorrhage, and I think shock depends largely upon the loss of blood in such cases.

Fracture of the Larynx—Abscess—Death.

RUSH R. GINGLES, M. D.

May 3, 1898, a messenger came to my office and requested me to go at once to see M. W. B., who had been seriously injured in a runaway. As usual the injury was misstated, the messenger stating that the abdominal region had been badly injured , while, in fact, the injury was of the neck. I found the patient in an erect position, coughing and expectorating freely a bloody, frothy mucus; dyspœna was marked, especially on assuming the recumbent position, and there was considerable swelling and ecchymosis over the larynx. He was badly bruised in different portions of the body, but there was none serious except that of the larynx. The force, from all appearances, came from the front, driving the larynx against the vertebral column, probably fracturing the rodi in various directions, although the exact conditions could not now be ascertained, owing to the amount of swelling.

I applied ice to check hæmorrhage; ordered enemas, brandy in milk, every third hour, and on the evening of the injury temperature and pulse rate were normal; there was very little pain now except on effort to swallow. But from the date of injury he was unable to swallow a drop of anything.

May 4, a. m.—Pulse rate 80; temperature 103 degrees; patient very restless; gave bromides with enemas of milk and brandy; ordered him bathed to reduce temperature, and in the evening introduced stomach tube, giving liquids and nourishment in this manner.

May 5.—Pulse rate 100; temperature 103 degrees; breath slightly offensive; swelling and soreness abating.

May 6.—Pulse rate 120; temperature 103 degrees; breath very offensive, and every indication of pus formation; there was at no time great difficulty of breathing or talking after first few hours, and no evidence of injury to pneumogastric or recurrent laryngeal nerves, but there was evidence of absorption of pus from seat of injury; the system seemed simply overwhelmed with the poison, and death closed the scene on the evening of May 6, four days after injury.

Fracture of the larynx is an extremely dangerous injury. Durham collected records of sixty-nine cases, of which fifty-three died. The mode of death is usually by asphyxia, either immediately as a direct consequence of the displacement of the fracture, or at a later period as a result of inflammatory swelling. But in this case, as before stated, it seemed to come from the extensive pus formation.

The rarity of the injury, as well as the rather unusual termination, prompted me to report the case.—Louisville Medical Monthly.

Trains Run by Telephones.

Operating trains by telephone instead of telegraph is a radical innovation that has been made by the Illinois Central Company. It is one of the first attempts ever made to direct the movements of railroad trains by anything but the time-honored written telegraphic order. But officers of the experimenting company pronounce the verbal system a success and it may be tried for longer distances.

The telephonic train dispatching has been done on the elevated tracks of the St. Charles Air Line, running from this line's connection with the Illinois Central, near Fourteenth street, to the river, a distance of about two miles. The distance has nothing to do with the work, as the principle of handling trains is the same as though the line were 100 miles long.

MANY TRAINS MOVED SAFELY.

All of the trains moved over the Air Line are subject to verbal orders of the telephone dispatcher, with office in an elevated block-house near the point where connection with the Illinois Central is had. None of the orders is written down or telegraphed, the telephone being the only method used.

During the time the experiment has been going on the dispatcher has moved 11,664 trains over the elevation by telephone without an accident. During most of the time a single track has been used, and with the completion of the other tracks the telephone system may be continued or it may be abandoned.

Handling trains by telephone is a distinct departure in railroading, but the success of the Illinois Central experiment may lead to a general adoption of the system by the big terminal companies in and around Chicago, where it would be particularly applicable. It would save the terminal people a great deal of money, as it would obviate the necessity of hundreds of expert telegraphers, to say nothing of the time saved in sending and copying messages.

Local Anæsthesia.

℞ Cocaine, hydrochlorat .... .04 cgm.
Spartein, sulphat ..... .05 "

Dissolve at time of using in one or two cubic centimeters of boiled water.—Bagot.

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IMPORTANT!

The Big 4 and C. & O. have decided to issue tickets at one fare for the round trip for surgeons and immediate members of their families desiring to attend the Richmond meeting that are not provided with free transportation.

NOTICE TO MEMBERS.

As this is the last issue of the Railway Surgeon which will be published before the annual meeting, all the information available up to going to press is presented herewith.

FROM DR. BROCK.

"I have been advised that an impression has gone abroad that there is a great deal of smallpox in the East. There is not a case of smallpox in the city of Richmond, nor is there one, so far as I know, between Richmond and Cincinnati, so that I may say with positiveness that no one will be exposed to the contagion of this disease by reason of attending the meeting at Richmond. The meetings will be held in the Masonic Temple, just two squares from the "Jefferson Hotel," the headquarters of the Association. Ample room has been secured for exhibitors. You will please also state that members attending this meeting and wishing to attend the meeting of the American Medical Association at Columbus will have three days of grace, which we hope to make pleasant for them, along the line of the Cheasapeake and Ohio, giving them plenty of time to reach Columbus before the meeting, and in the meantime to enjoy the beauties of the C. & O.

"C. W. P. BROCK."

SPECIAL TRAIN.

The special train bearing the railway surgeons to Richmond will leave Cincinnati May 29, about 9:10 p. m., reaching Richmond about 3:30 p. m., running as the second section of No. 4. As heretofore stated transportation issued by the C. & O. is good on any of their trains.

HOTELS OF RICHMOND.

Jefferson Hotel (headquarters of the I. A. R. S.) $4 per day. Bathroom for one, two or three persons occupying the same or adjoining rooms $1 per day extra.

Murphy's Hotel, corner Eighth and Broad streets, European plan, $1 per day; American plan, $2.50 per day.

New Ford's Hotel, corner Eleventh and Broad streets, American plan, only $2.50 per day.

The Lexington Hotel, Twelfth and Main streets, American plan, only $2.50 per day, and other smaller hotels in proportion..

St. Claire Hotel, Ninth and Grace streets,

Davis House (European) only one square from the Main street line.

SLEEPING CAR RATES, PULLMAN COMPANY.

This company will be pleased to extend to the delegates and immediate members of their families the concessions heretofore granted. If the delegates pay sleeping car fare over our lines enroute to Richmond, our representative at that point, Mr. Edw. Donaldson, will furnish papers for the return trip upon the presentation of receipts showing fare paid, and the usual credentials of your organization.

E. A. JEWETT.
Asst. Gen. Supt.

Miscellany.

Preliminary Program.

Dr. R. A. Patchin, Chief Surgeon Des Moines Northern and Western Railroad, Des Moines, Ia. The Relation of the Railroad Surgeon to the Railroad Employer.

Dr. D. C. Brockman, local surgeon Iowa Central Railroad, Ottumwa, Ia. The Treatment of Tetanus.

Dr. A. O. Williams, Ottumwa, Ia. Compound Fractures.

Dr. W. J. Purkhiser, Salem, Ind. Inguinal Hernia with Report of Two Cases.

Dr. George S. Rennie, Hamilton, Ont. A Review on the Subject of the Examination of Railroad Employes with Report of Examinations on the T. H. and B.

Dr. G. P. Conn, Concord, N. H. Progress of Hygiene and Sanitation.

Mr. E. J. Rich, Attorney Boston and Maine Railway, Boston. The Claim Department of our Eastern Railroads and its Relation to Medical Organizations.

Hon. B. B. Munford, division counsel of Southern Railway Co. Character and Attainments of the Medical Officers of Railroads, their Relation to the Legal Department.

Dr. D. S. Fairchild, Clinton, Ia. Lung Affections, the Results of Trauma.

Dr. C. R. Dickson, Toronto, Can. The Instruction of Railway Employes in "First Aid."

Dr. H. G. Fairbrother, E. St. Louis, Ill. Railroad Hygiene.

Dr. J. Schneck, Mt. Carmel, Ill. Differential Diagnosis and Treatment of Lumbago and Sprained Back.

Dr. Lester Keller, Ironton, Ohio. The Selection of Surgeons.

Dr. W. F. Sturgill, Ceredo, W. Va. Mental Examination for Railroad Employes.

Dr. J. N. Warren, Sioux City, Ia. Report of C. C. Fracture of the Pelvis Involving Acetabulum.

Dr. Thos. H. Manley, New York. The Role of Primary and Secondary Osteoplastic Surgical Procedures in the Treatment of Compound or Complicated Fractures of the Extremities.

Dr. H. C. Young, Bloomfield, Ia. Head Injuries, with Report of a Case.

Dr. R. F. Miller, Sherman, Tex. The Railroader and His Eye.

Dr. R. E. L. Kincaid, Bonham, Tex. Gunshot Wound of the Knee, Report of a Case.

Dr. Milton Jay, Chicago, Ill. Traumatic Tetanus.

Dr. J. L. Wiggins, E. St. Louis, Ill. Simple and Efficient Method of Skin Grafting.

Dr. Hugh M. Taylor, Richmond, Va. Bullet Wounds of the Abdomen.

SYMPOSIUM ON BURNS AND SCALDS.

Dr. J. Alex Hutchison, Montreal, Can. Pathology.

Dr. F. J. Lutz, St. Louis, Mo. Complications and Sequelæ.

Dr. H. A. Bruce, Toronto, Can. Primary Treatment.

Transportation to Richmond.

The following additional replies have been received:

COLORADO MIDLAND.

We will be pleased to furnish transportation to any surgeons of our line or surgeons of foreign lines over our road on application of proper officers.—Geo. W. Ristine, Pres. and Man.

COMPANIA CENTRAL MEXICANO.

We shall be glad to furnish surgeons free transportation over our lines, provided same is requested by the general managers. Under our rules we cannot furnish free transportation to surgeons who are not actually in the employ of railroad companies.—H. R. Nickerson, Gen. Man.

GRAND RAPIDS AND INDIANA.

It will give me pleasure to honor requests from the proper officers of other companies for surgeons in their employ who desire to pass over any portion of our lines, and shall be glad to make such requests for our own surgeons.—J. H. P. Hughhart, Gen. Man.

HANNIBAL AND ST. JOE.

We will be very glad to issue transportation to your members upon receipt of regular application of officers of other roads, authorized to ask for such transportation.—Howard Elliott, Gen. Man.

HOUSTON & TEXAS CENTRAL.

We will take pleasure in issuing transportation to members of the service of connecting lines who may have occasion to use our line en route to Richmond.—G. A. Quinlan, Vice-President.

ILLINOIS CENTRAL.

I beg to advise that the practice of this company in the past has been to give passes to its own surgeons going to these conventions and to surgeons of other lines upon request of proper executive officers. We shall do the same this year.—J. T. Harrahan, Second V. P.

LOUISVILLE, EVANSVILLE AND ST. LOUIS.

This line will ask for transportation for such of its surgeons as we may deem practicable to have attend the convention and will grant transportation to surgeons of other lines whose

operating officials will make request on us.—Geo. T. Jarvis, Rec. and Gen. Man.

NORFOLK AND WESTERN.

We will be glad to honor requests of proper officers for transportation of surgeons and will also make requests on connecting lines.—J. M. Barr, V. P. and Gen. Man.

PENNSYLVANIA.

We will be very glad to issue passes for company surgeons upon application from the proper executive or operating officers of the companies.—J. B. Hutchinson, Gen. Man.

En Route to Richmond.

Those members from North and West who attend the meeting in Richmond and have never been over the Chesapeake & Ohio have many surprises in store for them. Those who have been over it will be doubly interested, for no one can see all the beauties on one trip. We know of no trip that gives such a variety of scenes. We follow a water course to its fountain head.

ON THE GREENBRIER RIVER (C. & O.)

When leaving Cincinnati we go along the Kentucky bank of the Ohio river and see many water craft, among them palatial passenger steamers that run to Pittsburg, 500 miles away. When we leave the Ohio we cut across country to the Big Kanawha, a tributary of the Ohio, and find even here steamers from Cincinnati and Pittsburg. Along this beautiful valley we notice some of the remains of former greatness when this was one of the large salt producing sections. We see government locks and dams, we pass by Charleston, the state capital, through a great coal region, past Kanawha Falls and into New River Cañon. We proceed along New River and marvel at its awful wildness and grandeur. You wonder at nature being so lavish and marvel at man being able to build a road through this cañon.

When we leave New River we go along one of its tributaries, the Green Briar, with its pastoral loveliness, with here and there an abrupt cliff or a fall in the river to remind us that New River is not far away. Up and up we go past White Sulphur Springs, where many political schemes were laid before the war. By and by we realize that we have reached the top of the Alleghanies, and without even pausing for a breath we start on a rapid course down toward Jackson River. As the scenes change we realize that we are in "Ole Virginny" and we see visions of darkeys, pine woods, battlefields, summer resorts, etc., floating before us, with now and then some startling bit of nature to arouse us from our reverie, as we see the majestic Blue Ridge, the wonderful panorama of the Piedmont valley, or the beautiful Shenandoah pass before our eyes, but 'ere we are aware we are "On to Richmond." K.

1. When you cross the Ohio River at Cincinnati you come into Kentucky.

2. It is the Licking River that empties into the Ohio between Covington and Newport.

3. It is 500 miles to Pittsburg, and the big passenger and tow-boats go up that far, smaller ones even up farther.

4. The Ohio gets quite low in summer and the large boats, those drawing over three feet of water, have to quit running.

5. The tow-boats bring down coal and other heavy freight, and a large boat can bring twenty or more barges, containing 25,000 bushels each.

6. The river gets very high at times, flooding the lowlands. As much as 65 or 70 feet of water in the channel.

7. It gets clear at times when low.

8. That's the Scioto River that comes just below Portsmouth, O.

9. Portsmouth has about 20,000, and is noted as being a shoe manufacturing town.

10. The Scioto valley is very fertile.

11. Irontown, O., opposite Russel, has about 15,000 and is noted for its iron manufacturies.

12. Ashland, Ky., is at the junction of the N. N. & M. V. and C. & O., has an enormous steel plant and rod mill.

13. Cattletsburg is the last town in Kentucky, for when you cross the Big Sandy River you are in West Virginia.

14. Kenova is named from the three states, Ken., O., Va. That's the Norfolk & Western that comes in here and crosses the Ohio by bridge. That's the most southern point in Ohio, just across the river.

15. Huntington has about 15,000 and depends largely upon large car works.

16. We leave the Ohio just above Hunting-

ton where we cross the Guyan River and take across the country to the Great Kanawha.

17. Yes, Cincinnati and Pittsburg packets come up there.

18. That's the Coal River that flows in at St. Albans.

19. Yes, that's Charleston, the State capital, across the Kanawha. Charleston was incorporated in 1794. It was originally called Ft. Clendenium. No, Wheeling is not the Capital. Elk River puts in just below Charleston.

20. Yes, they mine and ship millions of bushels of coal along this valley and ship by river and rail. It is mined way up on the sides of the mountains. The veins are horizontal strata and from 3 to 5 feet thick, mostly splint coal, and some mountains have several veins of it in them.

ON THE NEW RIVER (C. & O.)

21. That's the K. & M. across the river.

22. Yes, the Kanawha is locked and dammed by the Government.

23. Those long rows of fires are coke ovens, where the coal is converted into coke before shipping.

24. Most of the Kanawha coal finds a western market, Cincinnati and Louisville being good markets, but the coke is shipped in all directions.

25. Kanawha Falls are 30 feet high. When the river is high the whole fall is covered by water.

26. That's the Gauley River that comes in just above the Kanawha Falls, and the old abuttments are the remains of an old bridge burnt during Lightburn's retreat.

But now you start into one of the most picturesque regions known. Yes, New River and Gauley from the Kanawha and you are now going up the New River. This was the original survey of the Kanawha and James River Canal, proposed by the French government to carry coal over the Alleghanies.

THE NEW RIVER (C. & O.)

27. That cliff at the left just before you cross the New River Bridge is Hawk's Nest. It is also called Marshall's Pillar. It is 1,600

feet above the bed of the river and 2,300 feet above the sea level, and the view from the top of it is grand. You cannot see the top of the mountains from the railroad.

28. This is the famous Red Ash coal field you are going through, and the coal makes fine coke. Most of the coal is shipped to the seaboard.

29. The miners who live in these houses are good citizens, quiet and industrious, and most of them make a good living. Oh no, this is not a poverty stricken region by any means.

30. That cable that reaches across the river at Caperton from the opposite mountain top to the railroad, transports coal in ½-ton buckets, and they bring over from 400 to 600 tons per day.

31. The New River used to be clear except when high, but ore washing in Virginia keeps it muddy. The fishing is not so good as it used to be. New River Falls are very pretty; look out for them.

32. Hinton is a railroad town, the end of a division.

33. We now proceed up Green Briar River which is a tributary of the New River and go through a much more fertile region.

34. The fishing in Green Briar is very good, bass being plentiful.

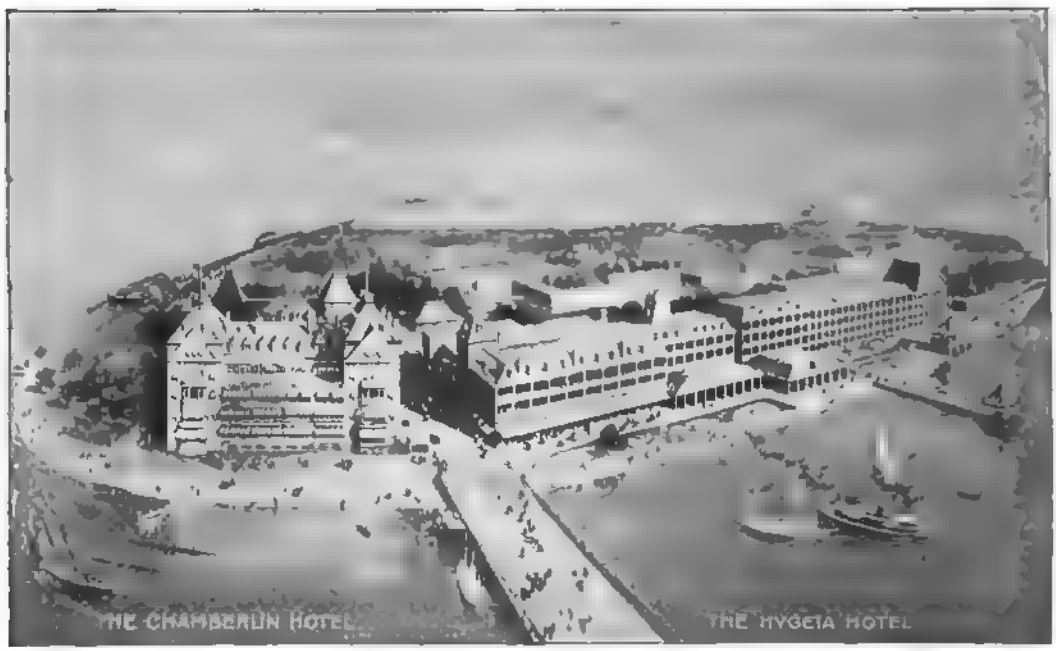
35. This is a limestone country and we are now in the geological strata beneath the coal measures.

36. We do not get a very good view of White Sulphur from the train. It used to be a great political center, and is quite a fashionable resort yet.

The City of Seven Hills.*

From the vantage ground of any elevated point in or around Richmond the eye takes in a scene of varied and picturesque interest. The natural features of the landscape, with its variety of hill, valley, and plain, threaded by the waters of the river, combine to make a picture whose beauty has long been admired and celebrated. These natural beauties seem a fit setting and frame for the city itself, with its varied human interests and romantic history. In natural and historic interest, fame ranks Richmond among the very first cities of the country, with a reputation far surpassing that of many other places superior to her in population and wealth.

While the events of recent years have added to her ancient prestige as the capital of the Old Dominion, the city is also rapidly advancing, in her modern progress, to a commercial and business importance that may prove commensurate with her ancient and historic interest. The busy, growing Richmond of to-day, fast developing her trade and manufactures, may enlist the interest and challenge the admiration of the mere business man, who sees everywhere the results of energy and enterprise that have more than doubled the city's area and population since the war. Gratifiying as is this fact of material progress, yet the main element of the city's interest and fame is on the historic side.



OLD POINT COMFORT (C. & O.)

*The following matter is taken from Poindexter's Illustrated Hand Book of Richmond.

HISTORICAL.

1607. (May) Discovery of the site by Newport and Capt. John Smith, who explored the river to the falls.

1733. Town "at Shaccos, to be called Richmond," projected by William Byrd.

1775. Virginia Convention met in St. John's Church. Patrick Henry's "Give me liberty, or give me death" speech.

1782. Incorporated as a city.

1785. Foundation of Capitol building laid.

1786. Old Masons' Hall erected; first Masonic building in America.

1862. Seven days' battles, June 25—July 1.

1864. (May-June) Grant's campaign around city.

THE JEFFERSON HOTEL. (HEADQUARTERS OF THE I. A. R. S.)

1865. (April 3) Evacuation by Confederate army; large section of the city burned.

1870. Population 51,038. April 27, Capitol disaster, 65 killed, 200 injured.

1888. Electric railways inaugurated.

1890. Population 81,388. Lee Monument dedicated.

1894. City Hall finished. Chamber of Commerce building finished.

1895. Jefferson Hotel opened.

1896. Population, estimated, 95,000.

STREETS AND PARKS.

The streets are generally laid off in such regularity that it is easy to find the way from one point to another. The main thoroughfares and cross streets, intersecting at right angles, form squares of nearly equal dimensions, that average about sixteen to a mile. The streets running east and west, the length of the ctiy, are designated by names, the principal ones being, in order from the river, Cary, Main, Franklin, Grace, Broad, Marshall, Clay, Leigh. The cross streets east of Foushee street are designated numerically; from Foushee westward they are designated by names. Signs at every corner show the name or number of the intersecting streets.

CAPITOL BUILDING.

On the main thoroughfares the houses are numbered east and west from Foushee street. The numbering on the cross streets north and south begins from Main street.

Richmond is well provided with parks or public squares, whose total area is nearly one-

THE CITY HALL.

tenth of the city. The most important of these are:

Capitol Square, about 10 acres.

New Reservoir Park, 300 acres, at the west end.

Chimborazo Park, 39 acres, at the east end.

Jefferson Park, 6 acres, at Church Hill avenue and Twenty-first street.

Marshall Square, 7 acres, on Libby Hill.

Gamble's Hill, 8 acres, foot of Third street.

Monroe Square, 7 acres, at Main and Belvidere streets.

Riverside Park, 4 acres, foot of Laurel street.

STREET CARS.

Lines of electric and horse cars traverse the city giving easy and rapid access to or within a short distance of most points within the corporate limits or on the suburbs. Three lines of electric railway run the length of the city covering routes about four miles in length.

The Main street line extends from East

CHAMBER OF COMMERCE.

Richmond to Reservoir Park at the extreme west end.

The Broad street line extends the length of the street from Chimborazo Park to the Fair Grounds.

The Clay street line is mainly through residence streets from Union and Church Hills west to Main and Beech streets.

The Marshall street line extends from Main and Fourteenth to Marshall and Seventh streets, and from Adams street westward to the Fair Grounds.

Cross lines extend to the northern suburbs, and southward to Manchester and Forest Hill Park, across the river. They connect with main lines.

Hacks and carriages may be had at public stands, livery stables, and hotels. The Richmond hackman is generally a good-natured and polite colored Jehu, but the stranger may be warned that his information or invention is sometimes gauged to gratify the customer's curiosity.

POINTS OF INTEREST.

Forty years ago Thackeray said of Richmond that it was the merriest place and the most picturesque that he had seen in America. The merriment he found has been somewhat modified by the stern experience of later years,

JACKSON STATUE.

but the picturesque element of the city's situation and surroundings is a lasting feature.

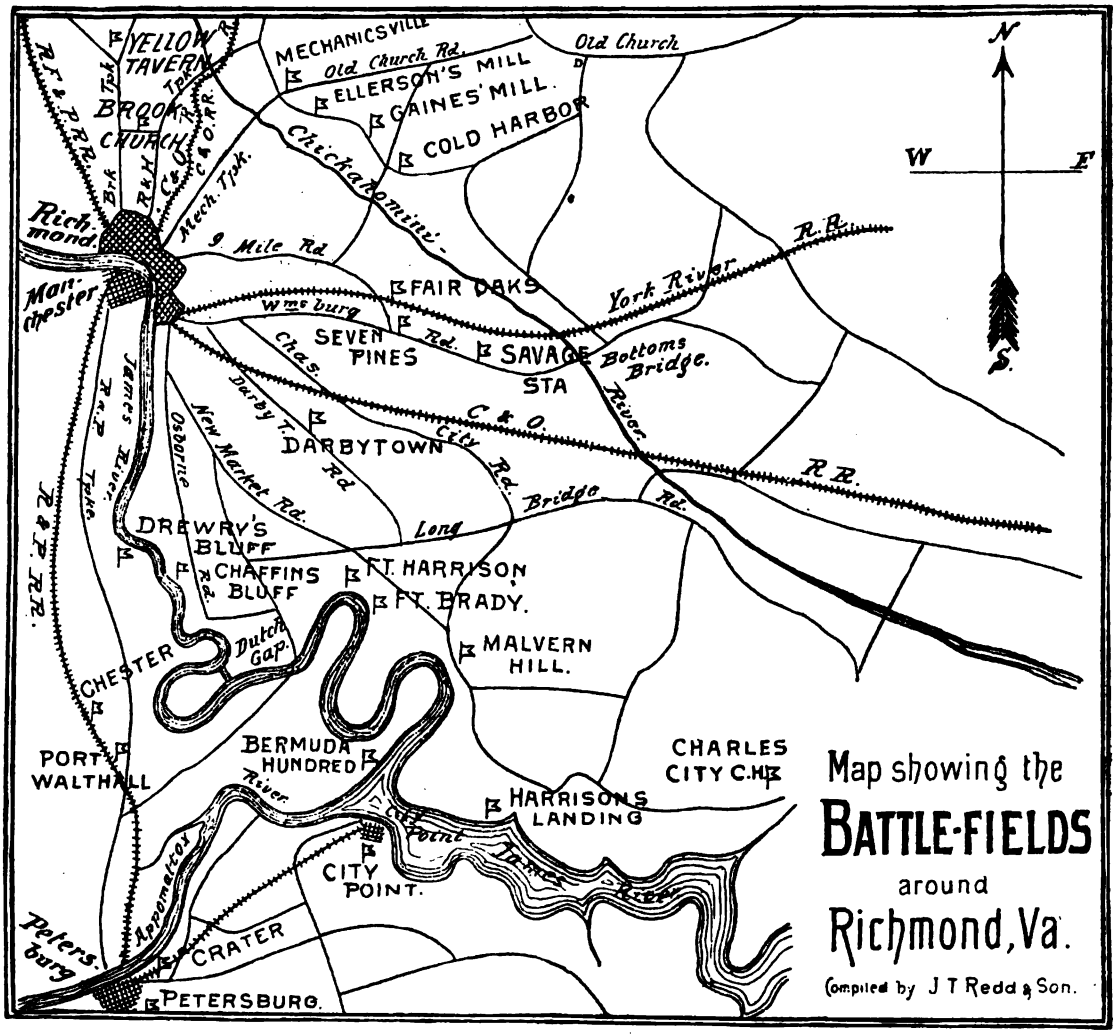
The view of the city and its surroundings from any commanding point presents a picture of varied beauty and interest. On one side of the river that divides the landscape the city is spread out over the hills and valleys. Across the river are the town of Manchester and the wide stretch of level country surrounding it and extending to the fringe of forest on the horizon. In the far distance the silver line of the river is lost in the curves of its winding course to the sea.

Libby Hill, in the eastern section, commands one of the widest and most interesting views. Just below, on level ground, between it and the river, is Rocketts, the oldest settled

part of the city. The view westward takes in a considerable section of the older part of the city, from Rocketts to the crown of Shockoe Hill. Northward and eastward are the streets and roads over which marched thousands of troops to the battlefields around the city, and over which the Federal troops entered the city, after its evacuation. No battlefield is visible from any point in the city, the view being obstructed by woods and the unevenness of the rolling country between. Libby Hill is

Confederate Government. The President's office and the Treasury were in the Postoffice building. Most of the buildings occupied by other departments were burned in the evacuation fire of 1865, which swept the area from Main street to the river between Gamble's Hill and Fifteenth street. In this neighborhood are now the quarters of the tobacco and grain exchanges and other commercial bodies, including the Chamber of Commerce building.

Westward from the Capitol are the principal



one of the outward spurs of Church Hill, which was so named from the location on it of old St. John's, in very early days the only church in the city.

A few squares from the church is Jefferson Park, from whose elevation, crowning a spur of Union Hill, another extensive view is had of the older part of the city. Crowning the level of Shockoe Hill are the City Hall and the Capitol Square with the state public buildings, the Washington Monument and other works of art. In the neighborhood of the Capitol were the department offices of the residence sections of the city. At the foot of Third street Gamble's Hill commands a beautiful and extensive view of the river and parts of the city.

The large and massive Masonic Temple is one of the landmarks of upper Broad street, and the lofty clock towers of the new Jefferson Hotel are conspicuous objects from many points. The architectural beauty and fine appointments of this building, covering half a square of ground from Franklin to Main streets, have gained for it wide reputation as one of the finest hotels in the country.

Many of the suburbs of Richmond are attractive from their natural beauty, but their chief interest is as the scenes of conflict in the late war. In many places there yet remains the earthworks thrown up for defense of the city, and in a zone of from 3-20 miles outside the city every road leads to battlefields.

Richmond is the center of a region of the highest historic interest. A circuit of one hundred miles around the city is the arena of more historic events than any other equal area in this country. Within that radius Anglo-American civilization was founded on this continent, and the political and military history of the Revolution was practically begun and ended; and here were decisive contests of the civil war. This circuit embraces Jamestown, Williamsburg, Yorktown, Petersburg, with Appomattox just outside the circle. All of these points are conveniently reached from Richmond by rail or water.

CAPITOL SQUARE.

The Capitol Square is the center of interest in Richmond, as the spot in and around which cluster many memorials of the state's history. The Square, inclosing about ten acres of ground, is an ideally beautiful park, adorned with trees, flowers and fountains. Within the inclosure are the Capitol, Governor's Mansion, Library building, Washington Monument and the Clay and Jackson statues.

The City Hall, fronting on Broad and Capitol, between Tenth and Eleventh streets, is of granite, five stories high, 186 by 140 feet, and surmounted by a tower of 180 feet high. The building was finished in 1893, at a cost of $1,500,000. Within it are located the various city departments and the city courts. Access to the tower, commanding a wide view, is from the fourth floor, which is reached by elevators.

The Monumental Church (Episcopal) on Broad street, below Twelfth, is built on the site of the old Richmond Theater and is a memorial of the disastrous burning of that structure December 26, 1811, by which some 60 lives were lost, including the Governor and other prominent citizens.

St. John's Church, at Broad and Twenty-fourth streets, was built in 1740; the nave and steeple were added later. During early days it was used also for political meetings, and it was here Patrick Henry made his famous speech.

The old Stone House on Main, near Nineteenth street, the oldest dwelling in Richmond, was built probably before the middle of the last century. It is now occupied as a museum. It has as much claim as some other places to its tradition as Washington's headquarters, but, as a matter of fact, the General was not in Richmond during the Revolutionary war.

In this lower part of the city, from Libby Hill to Nineteenth street, are located many of the larger tobacco factories, whose industry is the leading business of Richmond.

The Chamber of Commerce, Main and Ninth streets, erected in 1893, is one of the finest office buildings in the South.

Distance from Richmond (by rail) to—

	Miles.
Appomattox	123
Atlanta, Ga.	549
Baltimore, Md.	158
Charleston, S. C.	457
Chicago, Ill.	886
Cincinnati, O.	580
Fredericksburg	61
Jacksonville, Fla.	731
Luray	179
Natural Bridge	196
New York	344
Newport News	75
Old Point Comfort	85
Roanoke	170
Washington, D. C.	116
White Sulphur Springs	227

Extracts and Abstracts.

Separation of the Epiphysis of the Lower Extremity of the Humerus; With the Report of a Case in Which the Epiphysis Was Displaced Forward.

By Russell S. Fowler, M. D.

CASES COLLECTED FROM THE LITERATURE.

Case 1.—Dr Watson's case: Infant of two years, whose arm was violently wrenched by the mother while lifting the child. This case was seen on the fourth day following the injury. The swelling was so great as not to permit of an immediate diagnosis. On the ninth day, to quote Dr. Watson, "it was apparent that the shaft of the humerus had been separated from the cartilaginous expansion at the condyles near the elbow." The fracture was reduced and good position maintained by means of angular splints of pasteboard. Union was brought about at the end of six weeks; no mention is made of the result as regards mobility of the joint.[1]

Case 2.—Dr. Reeve of Dayton, Ohio, sent Hamilton a specimen of epiphyseal separation occurring in his practice in 1864. The patient was a girl of ten years, who fell ten feet, striking probably upon the elbow. The result was a compound fracture which, at the end of three weeks, necessitated amputation. A small fragment of the shaft of the humerus was taken away with the epiphysis. The specimen in this case shows that the separation was above the epicondyles, closely following the epiphy-

seal line. Hamilton has a picture of this specimen on p. 290 of his work.

Case 3.—Drs. Little, Voss and Buck have reported a similar case.[3]

Case 4.—Lange reported a similar case. In his case the epiphysis was removed from the wound and a portion of the shaft excised. The final result was a useful arm.[4]

Case 5.—Champion in 1818 reported a case of a boy of 13 whose epiphysis was torn away by his arm being caught in machinery. Amputation was necessary.[5]

Case 6.—Mr. Hutchinson, Sr., describes a case in which the fragment projected and was excised. The patient recovered with a stiff elbow.[6] He also has seen "half a dozen recent examples of this form of injury; twice as many old ones in which advice was sought in consequence of the awkward deformity which often follows it." All these were backward displacements.

Case 6, 6', 6".—Only one or two other cases similar to his were described by other surgeons about the same time. In these it was found that the epiphyseal line had been followed fairly well.

Case 7.—Clark reported a case, twelve years of age, in which death from gangrene occurred, due to tight bandaging. In his case the detached epiphysis did not include the epicondyles.[7]

Case 8.—Specimen in museum of Bellevue Hospital. This specimen shows the bones of the forearm of a child with cartilage detached which seems to be the lower epiphysis of the humerus. The history of the case is wanting.[8]

Case 9.—Hutchinson, Jr., had a case aged two years. Died from croup fifteen days after the accident. The specimen from this case is in the Royal College of Surgeons' Museum. It shows that the line of separation follows the epiphyseal disc only half way, diverging for the other half into the diaphysis.[9]

Case 10.—Hutchinson, Jr., child aged 13. Primary amputation. The detachment followed the epiphyseal line exactly except at the extreme external part.

Cases 11 to 35 inclusive.—Were simple cases, in six the result, as regards deformity and elbow movements, was perfect. In eight a certain amount of limitation of motion, usually about twenty degrees, was present. In only one case was rotation affected. These cases were reported by Hutchinson, Jr.

Cases 36 to 41 inclusive.—Compound-separation cases reported by Hutchinson, Jr., in which the diaphysis was reduced more or less perfectly.

Results.—No. 36 recovered with an almost perfect arm. No. 37 with thrombosis of the brachial. No. 38 (Volkmann's (?) recovered with paralysis of musculo-spiral but with good movements of the elbow. Nos. 39, 40 and 41 suffered amputation.

Cases 42, 43 and 44.—Compound-fracture cases reported by Hutchinson in which excision of the joint, more or less complete, was done.

Results.—No. 42 recovered with fairly good movement. No. 43 with a stiff joint. No. 44 with a fairly movable joint.

Cases 45 to 50 inclusive.—Compound cases reported by Hutchinson in which the projecting end of the diaphysis was excised to facilitate reduction.

Results.—Nos. 45, 46, 47 and 48 ended "satisfactorily." No. 49 recovered with a stiff elbow. No. 50 underwent amputation within three weeks because of non-union. (Hutchinson is not responsible for this case.)

Case 51. Reported by Hutchinson. Wright's case. Pulsation in the radial ceased on the eleventh day owing to pressure of the brachial between an anterior splint and exuberant callus. Case recovered with but persistent backward displacement of the epiphysis.

Cases 52 to 58 inclusive.—Complicated cases mentioned by Hutchinson.

Cases 59 to 64 inclusive.—Five cases of old separation of the epiphysis. Cases No. 59 and 60 were operated upon by Bardenhauer. Part of the diaphysis was removed. There was great improvement.

Case 65.—W. McAdam Eccles: Boy of ten years fell from a swing, alighting on his right hand. Elbow was painful. Medical advice not sought until some time had elapsed. No splint applied. At the end of three weeks elbow stiff and swollen. Right arm in position of flexion. Not able to extend it voluntarily. Full flexion could be satisfactorily accomplished. The biceps was kept contracted. Forearm somewhat pronated. Supination impossible to be completely accomplished without pain. Examination under ether showed flexion to be free. Extension could be forcibly accomplished. Crepitus about the joint. Other movements nearly normal. Dimple over the tip of the olecranon. Bony prominences bore their normal relationship to one another, but appeared to be on a plane anterior to the shaft of the humerus. Measurement of the arm negative. Some apparent increase in the length of the forearm. Skiagraphs of both elbow-joints show dimple mentioned above; also that the breadth of the limb in the region of the elbow was distinctly increased. This, without any local swelling. The ossific centers of the epiphysis were displaced distinctly forward. Results, good movements.

Case 66.—Russell Fowler. (Here first reported.) M. P., female, aged 9 years, was seen by Dr. Callender, then ambulance sur-

geon to the Brooklyn Hospital, at her home on the afternoon of April 9, 1898. Two hours previous to his visit she had fallen from a chair to the floor, striking upon the palm of the hand. There was present considerable swelling. The arm was within twenty-five degrees of complete extension. Disability was complete as regards the elbow-joint. The wrist and fingers could be moved. There was fullness in front of the elbow. The relation of the epicondyles to the olecranon was normal. The long axis of the forearm seemed to be pushed forward. Neither the trochlea surface nor the capitellum could be felt. Arm could be fully extended, but could not be completely flexed. There was very little crepitus and this was difficult to produce. Reduction was readily effected, but as readily recurred. It was accomplished by slight entension and direct pressure upward and backward of the small mass in the bend of the elbow. The arm was put up in extension with anterior and posterior splints and two compresses, one posterior and one anterior, to the joint. The patient was referred by Dr. Callender to my clinic at the Brooklyn Hospital Dispensary. She reported next day and as she was free from pain and the dressing seemed undisturbed the verification of the diagnosis was left to a later date. On the following day she returned, and as there were considerable pain and swelling then present the dressing was removed and the arm put up in a comfortable position. I saw her for the second time on the 12th. The arm was semi-flexed, enveloped in opium and lead compresses, and supported by a sling. There was absence of pain and the fingers and wrist could be voluntarily moved. What struck me most forcibly on inspection was the broadening of the point and the fullness in front of the elbow. The joint itself was swollen and the tissues around it somewhat so. The skin was reddened and somewhat discolored. There was pain on pressure. Passive movement of the joint caused pain which greatest on extension. There was no apparent spasm of the triceps tendon, but spasm of the biceps tendon was marked. The antero-posterior measurement of the joint was increased markedly as compared with the unaffected point. On extension the long axis of the forearm was in a plane anterior to that of the humerus. The relation between the olecranon and the epicondyle was normal. No trochlea surface nor capitellum was evident. There was no interference with the nerve-supply of the muscles of the forearm nor was there any anæsthesia present. The broadened lower extremity of the humerus was in the same plane as the shaft of the bone. The fullness in front of the elbow could be felt to be bony and of a fairly straight outline directly in the line of the joint. It could be reduced with the forearm extended, but reduction was painful and immediately recurred. Pronation and supination could not be voluntarily accomplished. Crepitus was difficult to elicit and when elicited was not true bony crepitus, but softer in character. There was no depression present above the olecranon. The radial pulse was of equal volume in each wrist. The previous history of the case as regards causation was the same as described by Dr. Callender. Posterior dislocation of the joint was ruled out from the above history, as was also supra-condyloid fracture of the humerus. Posterior displacement of the fragment in an epiphyseal separation could be readily ruled out by the absence of spasm of the triceps and the presence of the fragment anteriorly extending all the way across the joint, and the forward position of the long axis of the forearm in extension. Knowing the rarity of this separation of this epiphysis, and particularly the forward displacement of it, I was exceedingly careful in my examination of the case. As before stated, reduction, while readily accomplished, was difficult to maintain in the extended position, so the fragment was reduced in extension, and while the fingers of the left hand held it in place the forearm was carefully flexed and a compress substituted for the fingers in the bend of the elbow-joint. Lead and opium compresses surrounded the parts. Cotton was applied and a basket-splint of wire was fitted on and held in place by bandages. I saw the case on the 16th and reapplied the dressing. There was more swelling present on this occasion and the case was told to report in two days. On the 20th the case reported at the hospital and was admitted to the service of Dr. George Ryerson Fowler. There was considerable swelling in and around the joint. Pulsation of the radial was imperceptible when the case was first admitted and the entire forearm was cold and pale. There was some doubt as to our ability to save the arm. Dressing was removed, the child put to bed, warm cotton was applied to the entire extremity and the arm laid upon a pillow and surrounded with hot-water bottles. Luckily the pulsation in the radial returned and the arm became warmer. The position of the fragment could not then be determined on account of the swelling. Some few days later the child was anæsthetized. The position of the epiphysis was fairly good. Considerable callus was present. It was evident that this exuberant callus, in conjunction with the swelling of the parts, had pressed the brachial artery against the dressing and so compressed it. The arm was put up at a little less than a right angle. The patient remained in the hospital until May 22d. At the time of discharge the position of the epiphysis was fair, there was still rather

abundant callus, the joint was capable of slight motion which gave promise of increase. I subsequently saw her once more. There was increased motion and less callus. She had been using the arm, as advised, and had experienced no ill effects. The entire arm had regained almost all its strength.

Case 67.—Case in the service of Dr. George Ryerson Fowler. (Here first reported.) V. S., a schoolboy, 11 years. Admitted to Brooklyn Hospital March 19, 1898. Fell from a bicycle and sustained a compound fracture of left elbow, with musculo-spiral paralysis. Examination with the finger through the open wound disclosed a separation of the lower epiphysis of the humerus with its backward displacement. The end of the diaphysis projected externally one inch above the depression in anterior surface of elbow. Deformity was reduced. Iodoform gauze drainage. Wet dressing. Arm put up in right-angled splint. Rapid healing. Busculo-spiral paralysis subsequently treated by neourorrhaphy after Bruns' methods, April 28, 1898." The nerve was freed from callus, fibrous cicatrical tissue split longitudinally beyond the limits of the cicatricial mass, uniting the divided ends, and sewn together angle to angle with split kangaroo tendon. Plaster-of-Paris right-angled cast. Eleven months after function of nerve was resored. Movements of elbow good.

Anatomy.—The lower epiphysis of the humerus includes both epicondyles, the epiphyseal line being a fairly straight one and crossing the bone just above the two epicondyles. Directly over it lies the olecranon fossa. The epiphysis has at first five separate centers of ossification. These are subsequently reduced to three. The ossification in the capitellum is said to begin during the third year. Hutchinson has found it at eighteen months and Farabeuf says that it usually occurs during the second year. The width of the epiphysis increases during the first few years. The depth increases slightly. The nucleus over the internal epicondyle appears in the fifth year. The third nucleus over the trochlea appears in the eleventh or twelfth year. A small separate nucleus appears over the external epicondyle. Fusion with the shaft is completed in the sixteenth or seventeenth year. The epiphysis grows relatively smaller as the individual advances in years. The widening of the epiphysis causes it to become more distant from the olecranon fossa. From this brief account of the anatomy it will be readily seen that the time for separation must be before fusion with the shaft takes place, that is before the sixteenth or seventeenth year at the latest, and also that it is far more likely to occur before the twelfth year. Separation with the epicondyles still attached to the humerus must necessarily occur before fusion with the trochlea and epicondyles takes place, that is before the thirteenth year (Clark's case). It is evident that as the epiphysis is so closely associated with the joint, injury to it must be injury to the joint also. The above may be called predisposing causes. The exciting causes are severe wrenching of the arm, as by some person lifting a patient (example Case No. 1), or machinery accidents in which there is great wrenching (No. 5); falling upon the posterior part of the palm of the hand with the forearm either wholly or partially extended (so in the majority of cases); falling upon the elbow (Case No. 2).

Varieties of Separation.—In determining this we must form our conclusions exclusively from those cases resulting in necropsies, operations, either amputations or excisions, cases of compound fractures not operated on which admitted of direct examination, and from those in which X-ray pictures have been taken. As in the etiology here also, account must be taken of the anatomy and development of the part at various ages. From the comparatively few cases reported it is exceedingly difficult to draw a definite conclusion. From the accompanying cases it is seen that there are three forms of separation; that in which the separation follows fairly close the epiphyseal line, that in which it follows the line in part only and diverges into the diaphysis, and that in which there is separation without including the epicondyles. The cases from which we are to decide this point are Nos. 2, 3, 4, 5, 6, 6', 6², 7, 8, 9, 10, 36, to 58 inclusive, 65 and 67. These fulfill the conditions as they are cases in which autopsies, operations, or compound fractures occurred, or in which an X-ray picture was taken. As complete a history as is to be obtained will be found in the list accompanying this paper where due credit is given to each reporter. Of these, fifteen compound cases were under the direct observation of Mr. Hutchinson, Jr. He remarks that clean separation occurred only in the minority of his cases. These cases are Nos. 36 to 50 inclusive. Of the remaining cases we can throw out those compound fractures without direct evidence as to separation, i. e., Nos. 51 to 58 inclusive. This brings the number of cases available for our conclusions in regard to this point down to eleven. Of these one (No. 7) did not include the epicondyles. This disposes of the third class of separation. Of the second class, those following the epiphyseal line for a part only and diverging into the diaphysis, we have two examples, Nos. 8 and 9. Of the first class, and these are fairly authentic cases, we have nine examples, Nos. 2, 3, 4, 5, 6, 6', 6², 8, 65, and 67. This shows that the epiphyseal line is followed fairly well in the majority of cases.

Displacement of the Epiphysis.—This may

take place in three directions irrespective of the tilting of the fragment, i. e., backward, forward, or laterally. Backward displacements comprise the majority of the cases. In all of Hutchinson's personal cases forward displacement was well marked but once. Eccles has lately reported one case (No. 65). In all of the elder Hutchinson's cases the displacement was backward. Some cases of lateral displacements are mentioned by Hutchinson, Jr., and probably some of the cases mentioned elsewhere in the list had this deformity. The author has seen one case (No. 66) in which the displacement was markedly forward. We may safely conclude that the very great majority of cases are displaced backward; that independent of this, or associated with it, there may be lateral displacement; and finally, that anterior displacement is extremely rare. The three cases mentioned are all that are to be found in literature.

Diagnosis.—The elbow is slightly flexed and the forearm is supported by the hand of the uninjured side. The forearm is midway between pronation and supination and the arm is helpless. The deformity is marked in some cases, not so prominent in others. There is backward tilting of the epiphysis or its complete backward displacement. The latter resembles a posterior dislocation and undoubtedly has frequently been mistaken for it. This backward displacement is due to the indirect force applied through the forearm, as in a fall upon the hand with the forearm extended on the arm, and its continuance is due to the action of the triceps. The fact that there is no outline of the trochlea and capitellum in posterior displacement is of use in diagnosing the condition from posterior dislocation. In case no deformity is present, pressure just above the line of the joint will develop slight crepitus and a characteristic give. Lateral displacement, either external or internal, may be present and is due to direct violence. Forward displacement is rare and its diagnosis will be elaborated in connection with the case reported. The antero-posterior diameter is increased. The olecranon is more prominent posteriorly. The tendinous insertion of the triceps into the olecranon is plainly perceptible. There is slight shortening of the arm. The displacement is easily reduced and readily re-

The following comprise practically all the cases reported. Hamilton, in his excellent work upon "Fractures and Dislocations," mentions several cases of separation of the epiphysis of the lower end of the humerus. He cites no personal ones.[1]

curs. The relation of condyles and the olecranon is normal, that is in flexion, a line drawn from one epicondyle to the other in a vertical plane crosses the lip of olecranon, and in extension a line drawn in a horizontal plane also touches the tip of the olecranon. Crepitus is present. Its character is soft, as of two cartilaginous surfaces rubbing upon each other. It is not easily elicited. Lateral movements are difficult to elicit. There is considerable mobility of the joint. Extension increases the deformity; flexion decreases the deformity. Separation of the epiphysis occurs most commonly before the seventeenth year. It is rare in adults. Dislocations occur most frequently between the fifth and fifteenth year, and it is this fact that has led some observers to state that separation of the epiphysis is a frequent complication of posterior dislocations.

The diagnosis lies between posterior dislocation of the elbow, supraconcdyloid fracture of the humerus, and separation of the epiphysis. Posterior dislocation can be readily ruled out as the normal relationship exists between the olecranon and the epicondyles. Anterior dislocation or other forms of dislocation at the joint could hardly be mistaken for separation as the presence and position of the capitellum and trochlea surface would decide. The most difficult diagnosis is between separation and supra-condyloid fracture. They have many symptoms in common. The direct cause is often the same. Wrenching would point in favor of separation. The age of the patient would be of use, the younger the case the more liability to separation in place of fracture with the same amount of indirect force. Separation is nearer the transverse line of the joint, in fact is in the line, while fracture is above it. The position of the arm is about the same, but the prominence in the elbow is more marked in fracture than in separation: in fracture, occupying a position above the transverse line of the joint and in the center of the long axis of the extremity, while in separation it is in the transverse line of the joint and extends completely across it either posteriorly or anteriorly. The character of the crepitus differs materially. In separation it is difficult to elicit and soft in character, while in fracture it is easily elicited and distinctly bony. The differential diagnosis between anterior and posterior displacement of the separation is to be made by the presence of the fragment in a line anterior to the long axis of the upper arm, the absence of spasm of the triceps tendon, the impossibility of palpating the fragment posteriorly, and the low degree to which the arm can be flexed.

(*Concluded in next issue.*)

In the class of fractures in which there is detachment of processes and apophyses, we very often fail to get crepitus, as in transverse fractures of the patella, fractures of the olecranon and coronoid processes of the ulna, and of the coracoid and acromion processes of the scapula.

Notes of Societies.

The program of the Section on Surgery of the Iowa State Medical Society at its 48th annual meeting at Cedar Rapids, May 17-19, is as follows:

Report of Chairman, Dr. G. R. Skinner, Cedar Rapids.

1. The Prevention of Wound Infection—Dr. C. E. Stoner, Des Moines.

2. Peculiar Case of Appendicitis—Dr. B. N. Torrey, Creston.

3. Gunshot Wounds—Dr. Lewis Schooler, Des Moines.

AFTERNOON SESSION—1:30 O'CLOCK.

Report of Committee of Arrangements.

Report of Nominating Committee.

Election of Officers.

Resumption of Section Work.

4. Hæmorrhage from the Palmar Arch—Dr. H. A. Leipziger, Burlington.

5. Spinal Meningocele, with Report of Case—Dr. Van Buren Knott, Sioux City.

6. The Relation of the Lymphatic System to the Removal of Malignant and Tubercular Neoplasms—Dr. D. W. Finlayson, Des Moines.

7. Hip-Joint Disease in General Practice—Dr. J. G. Biller, Cherokee.

8. Burns and their Treatment—Dr. H. B. McKlveen, Waverly.

The following officers were elected at the annual meeting of the Georgia Medical Association:

President—Dr. F. W. McRae of Atlanta.

First Vice-President—Dr. St. John B. Graham of Savannah.

Second Vice-President—Dr. H. B. McMaster of Waynesboro.

Secretary—R. H. Taylor of Griffin.

Treasurer—E. C. Goodrich of Augusta.

New Hampshire Medical Society, 108th Anniversary Meeting.

PROGRAMME.

Dissertation. "Insanity in Its Relation to Crime." By Chancey Adams, M. D., Concord. Discussion opened by Charles P. Bancroft, M. D., Concord.

"Report on Surgery." By H. L. Stickney, M. D., Newport. Discussion opened by N. W. McMurphy, M. D., Concord.

"Report of a Few Surgical Cases." By George P. Morgan, M. D., Dover. Discussion opened by A. C. Heffenger, M. D., Portsmouth.

Report, "Tympano-Mastoiditis." By Emdon Fritz, M. D., Manchester. Discussion opened by O. B. Douglas, M. D., New York.

Dissertation. "Some Forms of Paralysis Observed in Country Practice." By Chas. H. Cutler, M. D., Peterborough. Discussion opened by I. J. Prouty, M. D., Keene.

"Vaginal Hysterectomy and When Indicated." By Noel E. Guillet, M. D., Manchester. Discussion opened by F. A. Stillings, M. D., Concord.

"Tubercular Disease of the Urinary Apparatus." By J. M. Gile, M. D., Hanover. Discussion opened by Howard N. Kingsford, M. D., Hanover.

"Multiple Pregnancy; Report of Cases." By A. W. Shea, M. D., Nashua. Discussion opened by F. E. Kittredge, M. D., Nashua.

"The Report of a Case of Puerperal Eclampsia with Complications." By Edmund E. Hill, M. D., Suncook. Discussion opened by Charles R. Walker, M. D., Concord.

"Theory vs. Fact." By William F. Wallace, M. D., Plaistow. Discussion opened by D. S. Adams, M. D., Manchester.

"Odds and Ends." By A. F. Wheat, M. D., Manchester. Discussion opened by I. L. Carpenter, M. D., Manchester.

"Pneumonia in Children." By W. H. Aldrich, M. D., Marlborough. Discussion opened by S. M. Dinsmoor, M. D., Keene.

"Hæmostasis in Intra-Pelvic Surgery." By A. C. Heffenger, M. D., Portsmouth. Discussion opened by E. F. McQuesten, M. D., Nashua.

"The Rationale of Medicine." By S. W. Roberts, M. D., Wakefield. Discussion opened by G. P. Conn, M. D., Concord.

"Embolism of the Mesenteric Vessels." By O. W. Goss, M. D., Lakeport. Discussion opened by W. H. Harriman, M. D., Laconia.

Florida Association R. R. Surgeons.

At the recent meeting officers were elected as follows: President, W. L. Hughlett, Cocoa; first vice-president, R. L. Harris; second vice-president, G. H. Altree; secretary and treasurer, R. T. Walker. S. G. Worley, W. H. Cyrus and Frank Caldwell were named as members of the executive committee.

The president appointed J. H. Hodges, R. P. Izlar and Leon A. Peek a committee on essays, with instructiones to select subjects for next year's discussion and assign them among the members.

It was decided to hold the next annual session in St. Augustine.

In opening abscesses do not forget that your incision should radiate: 1. In abscesses pointing near the nipple. 2. In abscesses near the anus. 3. In scarifying chemosis of the cornea. And that your incisions should be longitudinal: 1. In the hand. 2. The urtehra. 3. The scalp.—Fenwick.

Railway Miscellany.

Murder by Railroads.

On the subject of the attitude of the daily press toward railway affairs, the following from the Railway Conductor, coinciding very closely with what has been said in these columns more than once, is worth reproducing as it stands:

"MURDER BY RAILROADS."

Under the above caption a correspondent of the Democratic Herald of Charleston, Miss., who signs "Justice," delivers himself of about as senseless an argument as it has been our pleasure to read in many a long day. He says that "hardly a day passes that the papers do not report the killing of people by being run over by moving trains," and also, "has not the time arrived when the railroads of this country should be held to a more strict account for the killing of human beings?" He then argues that the loss of life from the cause mentioned is "the result of both carelessness and indifference of officers in charge of running trains," and that the only way to break it up is "by imposing heavy punishment upon the roads," which he terms "soulless corporations," which can be reached only "through their pockets." He scoffs at the idea of contributory negligence on part of the persons run over, and urges juries to "bear in mind that these (railway) officials are the employes of the road, that the retaining of their places and their daily bread depends upon their evidence being in vindication of their masters, and, therefore, their evidence comes through a polluted channel, and should be accepted with great caution and doubt by juries."

This last argument might well be considered as a direct insult by all the railway employes in the section from which the voice of this "Justice" arises. It cannot be unreasonable for us to assume that in the courts of the State of Mississippi the evidence of witnesses is taken under oath; nor can it be farfetched to assume that Mississippi has laws under which severe penalties may be assessed for perjury. The railway official or employe, when before the courts as a witness, is required by oath to tell the truth, the whole truth, and nothing but the truth. By what right or for what reason does "Justice" assert that the railway officials and employes are any less truthful than others?

Aside from the aspersion thus cast, the argument of "Justice" should be treated as a joke, were it not that there are so many readers who will assume that "Justice" does in reality know something about what he talks or writes about. Of course, it is gross neglect on the part of an engineer to have a drunken negro lie down on the track in some obscure place or after night. It is extremely bad judgment on the part of a conductor, busily engaged in his duties in the train, which, in accord with the demands of the public, is running at a high rate of speed, to have a thoughtless child run in front of the engine when it is so close that to stop is simply an impossibility. It is, of course, conclusive evidence of incompetency on part of the superintendent, busily engaged in his office a hundred miles away, to permit an absent-minded person to step upon the track in face of an approaching train. Truly! The State of Mississippi should seek out this "Justice" and make him railroad commissioner. He could then see to it that all the roads of the state were officered and manned with mindreaders, sightseers and fortune-tellers, who would have a proper regard for, and watchfulness over, the negligent, careless and absent-minded, and thus prevent such accidents as are now the subject of his agitation.

No doubt if the "Soulless Corporations" were mulcted heavily in a few cases, it would make the public more careful. If some corporation were obliged to pay $50,000 for killing some intoxicated tramp, it would at once put a stop to such accidents.

To be sure, the railroad companies might have built all their road upon an elevated structure; but if they had done so we fear the officials and employes would be so "careless and indifferent" as to permit some person, at some time, to fall from the structure. Injuries from this cause, however, could be largely protected against by properly upholstering the country through which the road passes.

The loss of human life, through any agency, is a very serious thing; and it is so recognized and felt by everyone. When "Justice" goes so far as to accuse the men who manage and run the railroads of his state with murder and perjury, he goes too far. If he could, just for once, experience the feelings of an engineer when his rapidly moving engine bears down upon a human being for whom there seems to be no possible escape, if he could once experience the drawing of the heart-strings of that engineer as his engine strikes and throws to one side or under the wheels a fellow being, he would conclude that he had made a very bad mistake and a very incorrect estimate. If "Justice" could see and feel and know the feeling with which the train crew pick up from the side of the track the form that has been thrown there by the engine, and which they do not know whether the breath of life has departed from or not; if he could have the heartrending experience of gathering up from the track the mangled remains of one who had been run over, he would be heartily ashamed of himself and his utterances.

The language and the point of view of the

correspondent of the Charleston paper are not new. Railway men are sadly familiar with his style of argument, but it never grows less amazing that any man can seriously write in such a vein. It is even more wonderful that railway companies and railway men have no legal protection. An individual, against whom such charges were made by name, would have redress. Is it not possible that a railway company could show that in the general animosity which is necessarily created against all railways by such language, it inevitably shared in such a way as to suffer peculiar and specific injury of such a nature as to justify damages under the law of libel? Would it not be worth trying when some particularly aggravated case comes up? Railway companies and railway men are so accustomed to abuse and misrepresentation, and to the necessity of being patient under injuries to which a private citizen would not for a day consent to submit, that resignedness has become a habit with them. They have almost forgotten that they are entitled to the equal protection of the laws with ordinary people. There is also a natural reluctance on the part of any company to take up a matter which is the concern of all companies alike; but, whether by a combination of several companies or by the individual action of one, we should like to see the railways make an effort to assert their rights to decent treatment by the press and the public.

The Regeneration of Iowa Central.

We have more than once referred in general terms to the work which has been done in improving the Iowa Central lines during the last four or five years, under the general management of Mr. L. M. Martin.

Since 1893—in spite of the panic of that year and the drought and bad crops which followed in 1894—the property has been systematically improved. By liberal ballasting, what was no more than a dirt road, especially from Oskaloosa, Ia., to Peoria, Ill., has been practically lifted out of the mud. Twelve thousand tons of steel rails have been paid for out of the earnings and nearly all of them laid on this section of the line. Side tracks formerly full of bad order cars have been cleared and cars rebuilt or "scrapped." Old engines have been throughly overhauled and an addition of 14 new, heavy modern engines purchased, as well as 750 new freight cars. Seven new passenger cars have been purchased and all old ones completely renovated. Six steel bridges have been erected upon substantial masonry; old wooden substructures have been torn out from under steel bridges erected in 1892 and masonry piers and abutments substituted.

Several new brick stations of modern design have been erected. At Oskaloosa a fine two-story station building has been built and large yards laid out and completed. A division station has been located at Monmouth, Ill., and a roundhouse built there with large yards and permanent water reservoir. Five thousand lineal feet of old wooden bridging were filled during 1898, in which year there were also some 75,000 yards of earth moved between Marshalltown and Grinnell in reducing grades. The application of air brakes and automatic couplers to the freight equipment of the company has been a heavy drain on it, but the end of the calendar year of 1899 will show a full compliance with the requirements of state and national laws in this direction. Four miles of new track were built during the fall of 1898 to new coal fields in Monroe county. Improved train service, both passenger and freight, has been furnished, and in all ways the road has materially increased, not only in its physical excellence, but also in public estimation in the territory through which it runs.

In addition to and in spite of the expenditures in the above items, a floating debt of some $300,000 has been canceled, so that there is now no debt or car trust of any kind against the property, while from the earnings of the first half of the current fiscal year a semi-annual dividend has been paid to the holders of the preferred stock of 1½ per cent. and from present indications this will be duplicated for the second six months of 1899.

Altogether the five years have seen unostentatiously carried out a thorough renovation of the property, such as it is not often the good luck of a railway company to go through in a similar length of time.

Mr. C. M. Hays, general manager of the G. T., has just returned from his first trip to Europe, and his reception at his debut at an annual meeting of the Grand Trunk shareholders in London seems (from accounts in the English papers) to have been in the nature of an ovation. Not only did Sir Charles Rivers-Wilson say all manner of nice things about Mr. Hays to the meeting, but another director must have made him blush when he said:

"I have been in Canada and have traveled all over the system, and have endeavored to get an insight into the general condition of the work. I have conversed and had much discussion with Mr. Hays and his managers. With our talented engineer I have been over many of the works and have admired the ingenuity and skill he has shown in the construction of the Victoria bridge. I was greatly astonished at, and greatly interested in, the marvelous change which has come over this great concern of ours. All that we used to

hear at these meetings was about how we should have stood if the rates had been such as they were ten years previously. I always said that we ought not to sit down and cry for better rates, but that we should try and make a profit out of present rates. That problem Mr. Hays has solved. (Applause.) The rates this year were worse than they had ever been known, and yet the profits have been great. By the judicious construction of bigger locomotives and bigger cars Mr. Hays has solved the problem of how to make a profit out of the poor current rates. As the result of this great change which had come over our concern, how do we stand as compared with four years ago? Look at the value of our stocks. In July, 1895, we could not pay interest on our debentures, and had to get money from the bankers, but we have paid that interest this year out of profits on a much larger stock, and also on the guaranteed and first preference stocks. How has that reacted on the value of our stocks? As far as I can calculate they are worth 14 millions more today than in 1895. That is a tremendous proof of the wisdom of changing the board and of the sagacity of the board in selecting Mr. Hays as general manager. (Applause.) I believe that their policy of bringing the line up to the highest state of efficiency is the wisest one, and if it is continued for the next four years we shall see a much higher value for our stocks. For the present state of efficiency and the present financial results we are pre-eminently indebted, not only to the wisdom of the board, but to the skill, experience, tact and able management of Mr. Hays."

The Independent Order of Railway Conductors elected the following officers at the annual meeting in Montreal, on April 26: Grand president, F. A. Hermance, New Haven, Conn.; grand vice-president, Victor Pigeon, Longueuil, Quebec; secretary and treasurer, E. B. Kenyon, New Haven, Conn.; marshal, H. F. Amadon, Boston, Mass.; chaplain, Thomas F. Cook, Springfield, Mass.; inner guardian, E. V. Post, New York; outer guardian, Theodore Cordes, Hoboken, N. J., grand executive committee, W. W. Pardee, New Haven, Conn.; F. J. Griffith, Hoboken, N. J.; George L. Spafford, Brattleboro, Vt.; insurance committee, Charles R. Nash, New Haven, Conn.; H. G. Bennett, Springfield, Mass.; Abram Ball, Brattleboro, Vt. The next convention will be held at Boston.

The Chesapeake & Ohio is said to have decided to improve its terminals at Newport News, Va., by the expenditure of about $1,000,000. The improvements include a new grain elevator, with a capacity of 1,000,000 bushels; a new coal pier, the enlargement of one of the present piers and the extension of the yards 3,000 feet to the north. Four miles of track will be laid in the addition to the yards, which will be three miles in length from the piers north and will contain 52 miles of track.

The Baltimore & Ohio Railroad has issued a notice that, beginning with the payment of wages by check on the first of May, no orders will be accepted upon any employe's salary. Notices to this effect have been sent broadcase along the road in order to fully inform merchants and others of the new order of things.

The Order of Railway Conductors has purchased Lookout Inn, on Lookout Mountain, subject to the approval of the majority of the members of the order at the next annual convention. The object in purchasing the hotel is to establish a university for the education of the children of railway conductors and an asylum for aged and disabled conductors.

For several years the Burlington route has advertised itself as the "third longest railroad in the world," and as owning "7,422 miles of track in eleven great states." These figures will have to be revised, for on March 1 its mileage was increased by the absorption of the Keokuk & Western Railroad, comprising 261 miles of track in Southeastern Iowa and Northeastern Missouri.

The Baltimore & Ohio has decided to abolish the pay car, and on May 1 will adopt the plan of paying employes by checks, to be distributed through the hands of station agents, payable at any one of the 37 banks upon the line of the system, and by any agent of the company. Under the pay-car system it takes three weeks each month to distribute a large bulk of currency aggregating $1,000,000 per month, and it is thought that the new plan will be more convenient, expeditious and safer.

Personal.

Dr. E. J. McOscar (Fort Wayne) has recently returned from an extended pleasure trip through Mexico.

Dr. W. T. Sarles, of Sparta, Wis., was elected president of the State Medical Society at its late annual meeting.

Owing to an error in the source of our information Dr. H. C. Young, of Bloomfield, Ia., was reported as dying. It was his father, Dr. J. W. Young, who died.

The I. A. R. S. is pretty well represented in the Mitchell District Medical Society. Dr. E. P. Easley, of New Albany, Ind., is the president and Dr. W. J. Porkhiser, of Salem, Ind., is vice-president. The next meeting is at West Baden Springs, June 29-30.

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VOL. V.—No. 1. CHICAGO, MAY 31, 1898. WHOLE NUMBER 105

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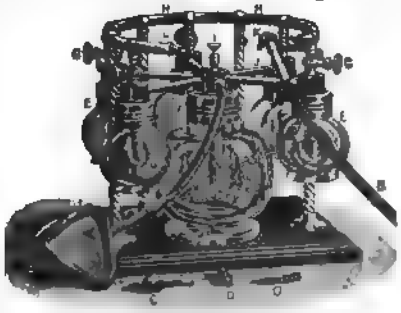

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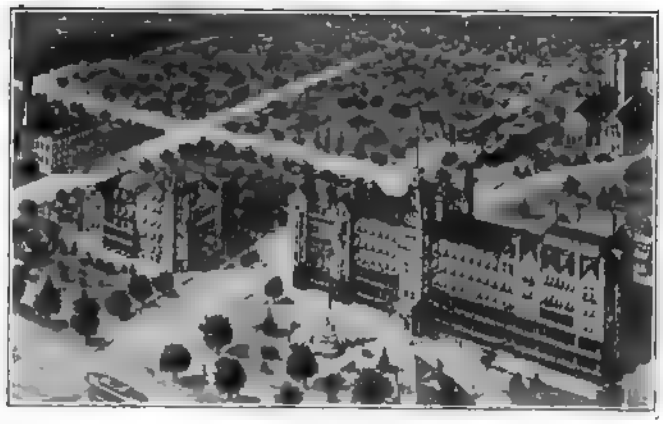

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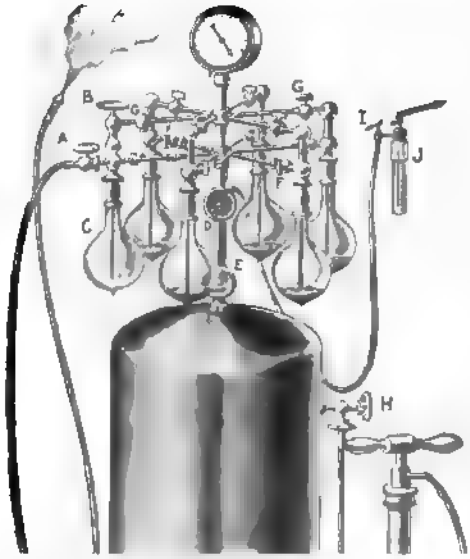

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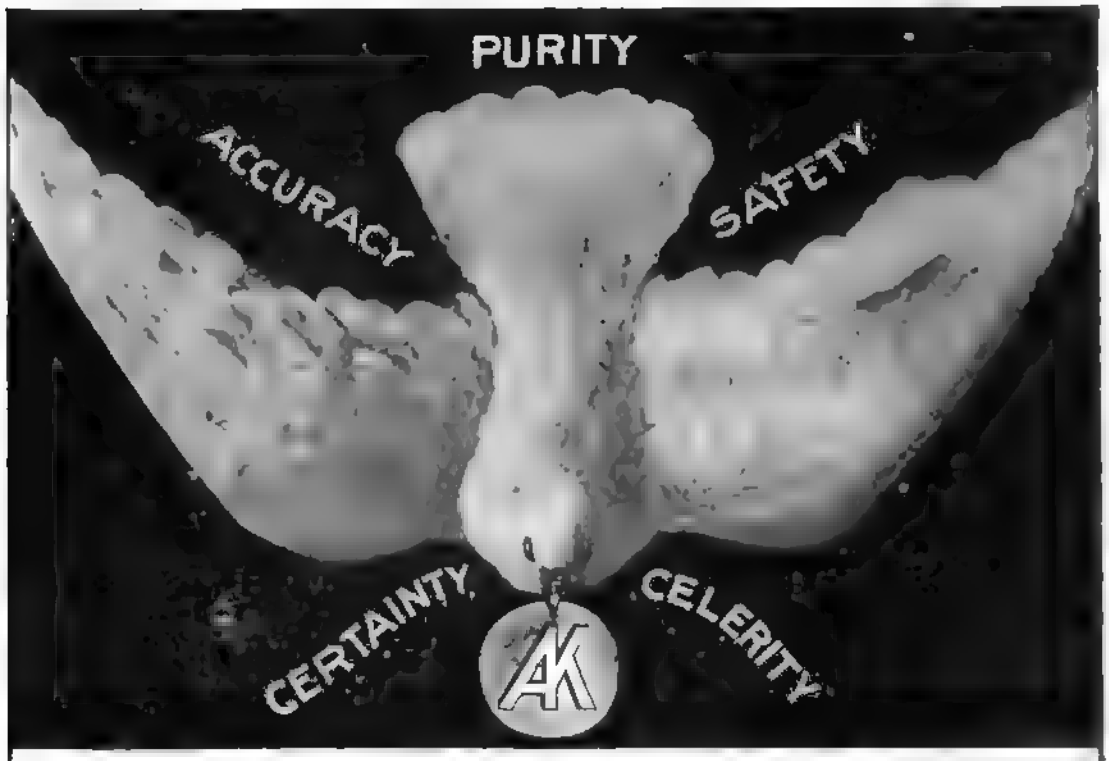

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Next meeting Dunkirk, N. Y.

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C. B. Herrick, M. D, Sec., Brooklyn, N. Y. Theo. D. Mills, Prest., Middletown, N. Y.

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Meeting in Baltimore, June, 1899.
L. H. Ball, M. D., Sec., Faulkland, Del. Robt. J. Reed, M. D., Prest., Wheeling, W. Va.

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Clay Johnson, M. D., Sec., Corsicana, Tex. L. B. Gunby, M. D., Prest., Sherman, Tex.

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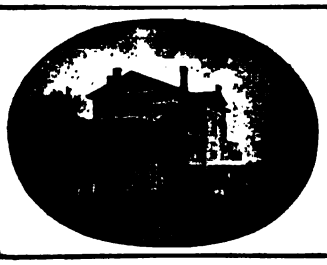
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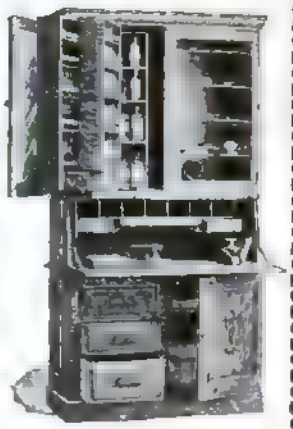

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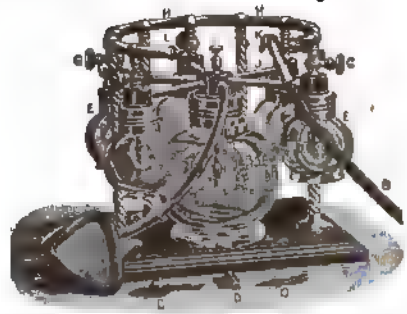

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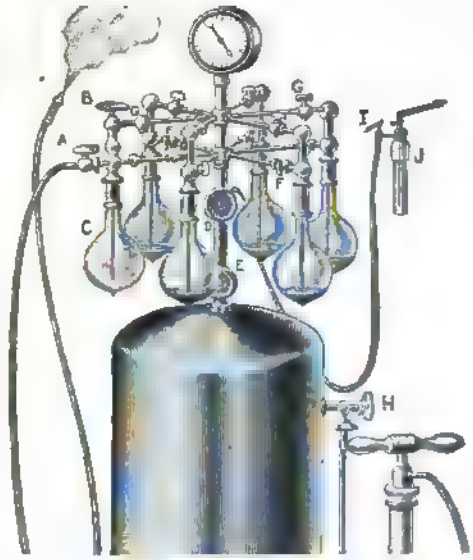

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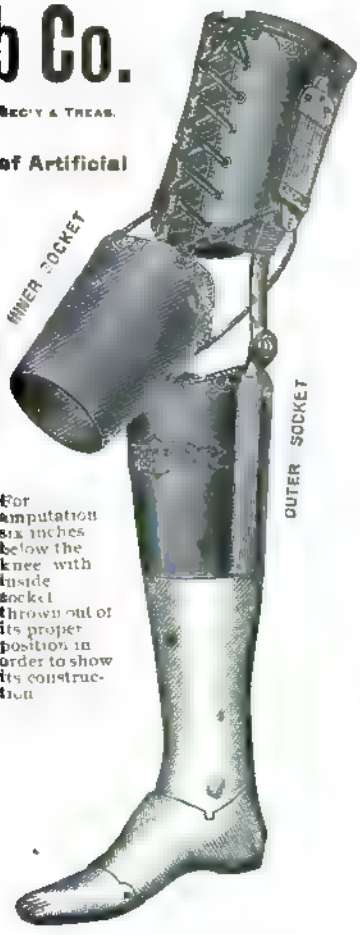

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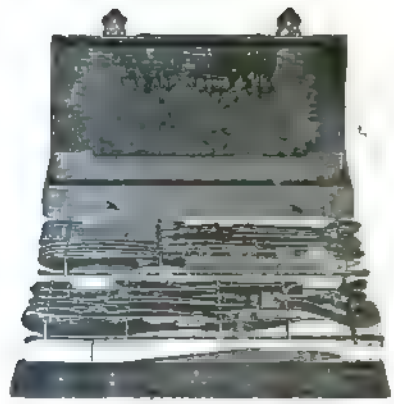

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